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[Founded in 1849 as the "Journal of Gas Lighting."]

VOL. CXLIX. No. 2957.] LONDON, JAN. 13, 1920. [72ND YEAR. PRICE 8d.

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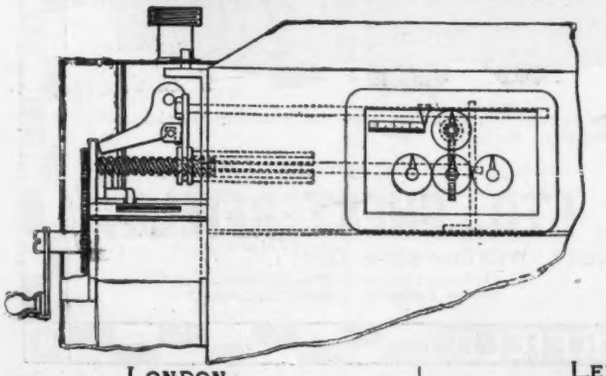

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Getting under One Roof.

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The bringing together under one roof of the organizations named does not mean their consolidation. It is a matter of policy to secure convenience and more advantageous working. Hitherto the organizations have been in their official habitations more or less sequestrated; and certain of them have had offices miserably located, and ill-adapted for their purposes. They have had a sort of hole-in-the-corner existence; and no one would have imagined that their headquarters represented something of such importance as the gas industry. The newer organizations have been in their initial stages largely relying on the generous hospitality of the Gas Light and Coke Company; and this hospitality was gained for them (we do not hesitate to say) through the deep interest and belief in co-operative action of the present Governor. But this is a condition that could not, and it was not wise that it should, exist longer than need compelled; and no one will be better pleased than Mr. D. Milne Watson to see the whole of the organizations housed in a state of complete independence, and fully equipped for their work. The matters in which the industry is now concerned—through developments within and outside itself—have in the aggregate increased so much, and individually grown so enormously in importance, that it has become absolutely imperative that there should be a much better concentration of forces. We can see advantage accruing in several ways from this. Conference, accessibility and availability, better distribution and division of work by mutual arrangements, without any loss of independence, will facilitate and expedite, and enable quick or effective measures to be taken. The work will go along more smoothly and rapidly, and with greater effect.

It must not be forgotten that the organizations that will find habitation in the premises in Grosvenor Gardens are working not for themselves, but for the industry. It was the bad old habit to put the individual dignity of an organization in a place superior to the common interests. There are traces of it even now. But it is dying a natural death. It could never survive the claims of current circumstances. If it had, it would have been fatal to the best interests of the industry. What was good enough (perhaps even fit) for the past, falls far short of requirement for the present and the future. The best and the strongest front that can be presented to-day by the industry is to be obtained by the unity of its parts and the amalgamation of its organized forces; and anyone who says to the contrary supplies a certificate to his own want of judgment. However, we have now the National Gas Council representing the very foundation of the industry—its finance, administration, policy, and other matters. We have the Institution of Gas Engineers representing the technical side of the industry. We have the Federation of Gas Employers dealing with its labour. We have the British Commercial Gas Association dealing with the development of gas uses; and the secondary products are being looked after in a way that they were not looked after in bygone days. And all the organizations dealing with these matters will be, before very many months pass, brought administratively and officially into one place. It was a good and wise idea; its materialization will typify a consolidation of interests, with a single intention and objective. Grosvenor Gardens will soon mean more to the gas industry than ever before.

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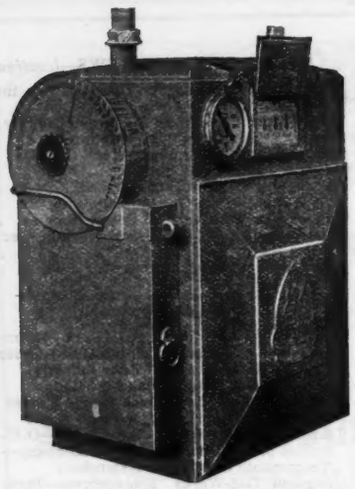

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IT seems pretty clear (though one can never tell what will happen in parliamentary proceedings) that, when the Bill establishing the heat-unit basis of conducting the gas business, is introduced to Parliament by the Board of Trade, it will be found that, through the agreed amendments to the Beilby report, the Bill will have a fairly peaceful journey. The action of the London County Council in accepting the report, to the settlement over which representatives of the Council were parties, gives a lead to other Metropolitan authorities as well as guidance for provincial bodies. The quarter from which organized opposition might have arisen (had there not been conference and agreement) is the Association of Local Authorities not Owning Gas Undertakings. From what has been learned as to recent proceedings of the Association, we think it may be taken for granted that the Bill, if it does not depart from the terms of the amended Beilby report, will not have any impediment placed by them in its path. The Association have thoroughly considered the matter, and discussed the position up and down. The main result is that Mr. H. Lang Coath, the Town Clerk of Swansea, has been instructed to watch the proceedings on any Bill giving effect to the report, and all matters upon which there has been agreement. Watching the proceedings does not mean active opposition; and therefore there is satisfaction over the position up to this point. It is not unlikely, though there is no positive information on the subject, that the question of financial revision will be dealt with in a separate Bill. It is more probable that this will be the subject of criticism and hostility; but justice and the necessity (to maintain the stability of the industry) of invested capital receiving a fair reward, are both on the side of the industry. We cannot imagine any fair-minded man denying, through legislation based upon defunct economic conditions, the right to legislative revision which will effect adjustmeat. The denial would evince a willingness to rob.

Calculating the First "Allowance."

DURING the past week there has been a considerable exercising of the managerial brains in the gas industry with the view of attempting to ascertain how the "Instructions" of the Coal Controller will work out regarding the division of coal purchase as between domestic gas and industrial gas, and the mode by which an allowance to gas consumers is to be made in the case of the ordinary ones at the end of each quarter (including in the current quarter the month of December), and of prepayment consumers as convenient during the quarter. In our editorial columns last week there was criticism of the "Instructions," and a reference to the several difficulties involved in making under the prescribed conditions even a fairly exact computation. Gas managers agree that a considerable amount of guesswork or rough estimating must rule, the approximate accuracy of which will only be capable of being tested when the quarter's revenue accounts are made up.

The Commercial Gas Company have already accomplished what most other gas undertakings have yet failed to do. By Saturday last, they had made public announcement of the amount of the allowance that will be made in respect of the current quarter, which is to include the month of December. The method of estimating the allowance to be made (as pointed out last week) is by taking a basis which may have no correspondence with the current quarter, and which will recede further from correspondence when a winter quarter becomes the basis for a summer quarter, or *vice versâ*. However, absurd as this is and will be, gas undertakings have no option, but must make an allowance "at the rate per 1000 c.ft. which results from multiplying "the total tons of coal used in the previous quarter by 120 "—*i.e.*, 10s. in pence—and dividing by the number of thou-"sands of cubic feet of gas sold in the previous quarter, "less a small agreed percentage in respect of expenses." Nothing is said there about domestic coal, but the terms "total tons" and "gas sold" are mentioned without the inclusion of the words "domestic or household." We assume that "domestic or household" is to be understood. However, following the "Instructions," the Commercial Company calculate that the reduction will be 7½d. per 1000 c.ft. to the ordinary consumers; while, in the case of the prepayment consumers, the present adjustment of 16 c.ft. per 1d. allows of a return to the consumer of 2½d. per 1000 c.ft. To this amount the allowance of 7½d. will be added; and on and after the 15th inst., the collectors will return to the prepayment consumers the sum of 10d. per 1000 c.ft. In the case of the ordinary consumers, the allowance will be made when the accounts for the quarter ending Lady-day next are rendered.

With a large, dense, and mixed—in great part, poor—population such as exists in the East-end of London, it was no doubt excellent policy on the part of the Company to give the consumers so early an intimation of the computed allowance. But what is a bit puzzling is how the Company, with the extensive home trades carried on in the East-end—especially tailoring work—have been able, within a week following the issue of the "Instructions," to arrive at the proportion of gas used for domestic and industrial purposes so as to enable them to compute the allowance for domestic purposes as distinct from industrial use. The Company have probably been working generously on past experience. To say the least, the allowance shows that it has been estimated in a very liberal spirit towards the consumers; and it should be of good service in stimulating the use of domestic gas this quarter. The ordinary price of gas before Christmas was 3s. 8d. per 1000 c.ft. It has been raised to 4s. 2d. from Jan. 1; and it is therefore from this price that the allowance will be made on domestic gas—making it 3s. 6½d. per 1000 c.ft.—at the time the accounts are rendered.

While in the first clause of the second "Instruction," gas undertakings are ordered to base their multiplication and division sum on the "total tons of coal used in the previous "quarter," they are directed in the next clause, in respect of the first allowance to be made at the end of this quarter, to "take account of rebates received, or to be received, on "coal delivered between the 1st of December, 1919, and the "31st of March, 1920." The two instructions appear to be at variance. The Commercial Company have a fine fleet of boats supplying their coal needs from the North; and they know pretty well what deliveries they can make at any period of the year—subject, of course, to extraordinary delays and weather. But a fair amount of assumption must have been brought to bear in the first week of January to enable the Company, in determining the domestic gas allowance, to "take account of rebates received or to be received" up to March 31 next on the amount of coal delivered and used for producing domestic gas.

Gas-Works Purchase and Capital Expenditure.

IT had been expected that the coming session of Parliament would have witnessed the discussion of a couple of important gas-works purchase schemes. But the fates, or the Sheffield and Sunderland Councils, have ruled otherwise. The Sunderland Town Council dropped their scheme almost as soon as the notice of the Bill was published; and the Sheffield City Council last Wednesday determined upon the excision of the gas-purchase clauses from their Bill. There was a powerful section of the Council who regretted the decision of the Parliamentary Committee to recommend the abandonment of the scheme; there was a still larger section of the members who were antagonistic for more than one reason. Before making comment, it should be said that we should be very sorry to see all the larger gas undertakings in the provinces transferred from private enterprise to municipal ownership; and particularly Sheffield, because it has in the past sold gas at a price that has not been equalled by any of the foremost municipalities in the country.

The price at which the Company were willing to part with the concern was the real reason for deciding not to purchase. Alderman Styring, the Chairman of the Parliamentary Committee, regarded the terms as reasonable; but he had not a large following. The discussion, however, showed some queer financial notions. There is no question that the Sheffield works require a considerable sum expended upon them. This is not a singular position after five years strenuous operation under war conditions, and the impossibility during that period of getting repairs, renewals, and extensions carried out. Somebody now has to pay. New capital cannot be obtained without offering interest or dividend upon it which harmonizes with the circumstances of the times. The consumers of gas will have to pay for the capital, whether the works belong to the Company or the Corporation. Then it becomes a question whether the consumers would or would not be better off in regard to the interest on new capital under the Corporation than under the Company. If the Corporation could borrow at a lower rate of interest than the Company could obtain new capital for, the consumers would certainly, in this respect, be better off. Besides, the provision for the repayment of the money by the Corporation would year by year reduce the sum upon which interest would have to be paid.

Of course, this question of capital expenditure is not the only one that affects gas service to the community; but we will not now go into the other matters—particularly the one as to the differences between company and municipal management. We have always had a preference for the former. Labour members of municipal bodies have generally a prepossession for municipal management of public services, and even of the nationalization of railways and coal mines. The Labour members of the Sheffield Council, however, are not apparently favourably inclined—at any rate, are not desirous—that municipal possession of the gas-works shall be achieved at a fair value. Their action appears chiefly to be responsible for the abandonment of the scheme. Perhaps it is as well. Still, once again the Sheffield Corporation, who have for decades been hankering after the gas-works, have missed an opportunity to acquire them; and when conditions become settled, and gas accumulates a larger business for all purposes—particularly for cooking and domestic and industrial heating—there will be councillors who will look back upon last Wednesday's vote with unfeigned regret. It will be more difficult, and the financial responsibility will be greater, in the future than in the present, to purchase the Company's undertaking. But perhaps the financial novices on the Council will not agree with this.

Sulphate Combination and Commonsense.

OF the secondary products of the gas and coking industries, there is not one that requires at the present time more circumspect handling than sulphate of ammonia. If handling and sale were to-day and henceforth left to individual producers, we feel confident the day is not far distant when there would be seen a very precarious position in connec-

tion with this commodity, and more likely than not considerable destruction of our markets for it. Dispassionately surveying the situation, the conviction hardens that this is a commodity in which the best possible can be done for all makers alike by co-operative working, in which the large producers giving support to the smaller ones themselves receive the protection that comes from shielding the smaller producers from the attacks that would be made upon them by combinations existing abroad. It has been observed recently that the German producers of sulphate of ammonia from coal carbonization and of fertilizers from the nitrogen of the atmosphere have combined for the purpose of defence and expansion of their trading interests, both at home and abroad. The American producers, too, we believe are also working co-operatively. We cannot survey these conditions, and the developments of fertilizer production in what were formerly markets that were largely open to us, without seeing that, if British producers operated individually, they would be at a grave disadvantage. It is idle and foolish to talk of rings and trusts in this connection when there will be combined forces in competition. Co-operative working in the circumstances is only commonsense. Another benefit of co-operative working is the economy it introduces into distribution.

The war period has taught producers much as to what can be effected in this direction; and therefore it is not surprising to learn from the annual report of the Sulphate of Ammonia Association, and the remarks of the President (Mr. D. Milne Watson) at the annual meeting, that a very considerable measure of success is attending the proposals to continue co-operative trading in sulphate of ammonia, through an organization which it is proposed to call the Sulphate of Ammonia Federation, Ltd. It is hoped to get the matter through during the next few weeks; and as the existing methods of dealing with the production under the agreement made by producers (with one important exception) expires on May 31 next, it may be taken for granted that by then the proposed Federation will be in existence. It seems to us that, if the Federation is being founded upon the methods that have obtained during the last two years, nothing could be absolutely fairer. The equalization scheme has prevented competition among home producers for export trade; and the small producers during the reign of controlled home prices have received their fair share of the export prices. What a difference these have made is seen by the fact that the total quantity exported, amounting to 36,870 tons, realized no less than £1,050,700, which equalled £28 10s. 6d. per ton. The tonnage exported is equal to 13·7 p.ct. of the quantity sold at home; so that the higher price received for this percentage has had a good effect in improving revenues. By the way, the 36,870 tons shows the difference that has, through war-generated circumstances, come over the sulphate of ammonia market. In 1913, the amount exported was 324,700 tons; and the estimated home consumption was 40,000 tons. The home consumption last year was 269,000 tons; so that the position has been largely reversed.

Now what are the chances of such a home consumption being maintained? The outlook is hopeful for a considerably larger business being continued than before the war. Farmers have learned more about sulphate of ammonia, and their appreciation has extended with the growth of knowledge. But the enlargement of use is not all due to greater knowledge and appreciation; some of it is owing to the absence or shortness of the supply of nitrate as well as to the relative prices with sulphate under control. The Board of Agriculture, too, have been helping to boost the use of the home-produced fertilizer. But nitrate will now exert itself more and more in the competition; and fertilizers from other sources will come in not far hence with increasing vigour. It would be imprudent to expect anything like a full retention of current home sales. More will have to be exported; and markets will have to be found under conditions that have no similarity to those that obtained in pre-war days. Even a general consideration of the position urges the wisdom of the Federation, if its foundations substantially represent the methods of joint operation that have prevailed in later times.

Gas and Coal Prices Muddle.

Referring to our editorial in last week's issue, headed as above, a correspondent draws attention to what he terms "a further point of indefiniteness" in the Coal Controller's recently issued "Instructions." The point relates to the last paragraph of "Instruction No. 2." It states: "The first allowance shall be made in respect of gas consumed during the first quarter of 1920 . . . and shall take account of rebates received, or to be received, on coal delivered between Dec. 1, 1919, and March 31, 1920." Gas companies, remarks our correspondent, start reading meters—some at the commencement of March, others at varying dates during the month; and, as readings are taken, so accounts are sent out, and in many cases paid, before the end of March. "It is therefore impossible to carry out the exact wording of this paragraph; for we do not know the amount of gas that will be consumed, neither do we know the amount of coal to be delivered up to March 31. It is true that this is qualified by the previous paragraph, and also by 'Instruction No. 3;' but at the same time it is a blessed (?) muddle." And this is the general verdict.

Price Reduction or Allowance on Accounts.

There are gas companies that had to make increases in the price of gas at the beginning of this year—much to the amazement of the gas consumers and the daily newspapers, in view of the reduction of the price of domestic coal. But cost of manufacturing and delivering gas and the 10s. reduction on the part of the coal carbonized for domestic gas production are two separate things; and must be treated as such. The intention of the Coal Controller clearly is that the 10s., less a percentage for expenses, shall be distributed as a rebate from the gas accounts, and not as a reduction in the price of gas. The price of gas must therefore be maintained at a level which takes no account of the 10s. No one knows how long the Government will be able to afford to subsidize the domestic coal market from coal export profits; and so one does not know how long the rebate can continue on the price of gas. The matter is all speculative; and it would not therefore do to interfere with the price of gas by representing the allowance or rebate to be a reduction in price. The distinction should, as quickly as possible, be made plain by every gas undertaking to its gas consumers. Mr. E. J. Fottrell, the Manager of the National Gas Council, has been pointing the difference out to the newspapers; but their comprehension is not so clear as it ought to be.

Salaries Question.

"Jutland" inquires in our "Correspondence" columns: "Where is the National Association of Technical Gas Officials?" The matter only seems to crop up by fits and starts; and we rather think this is due to the fact that a consistent need for such an organization does not exist in the gas industry. Many officials who are well paid and so comfortably situated take only a distant interest in a movement to elevate the material positions of less fortunate colleagues, who are left to struggle alone as best they may. The result is that they get disheartened. However, "Jutland" not only asks the question quoted above, but he has something to say which the Directors of the Hyde Gas Company will find of peculiar interest.

Rampant Labour.

To be a labour leader nowadays, with the best desire imaginable to do the utmost for the members of the union concerned, and in a statesmanlike way, is not an agreeable or enviable position. During the past week, there have been two instances of union leaders who have experienced the mortification of having the fruits of their negotiating labours flung back in their faces as being inconsistent with the views of the rank-and-file. It does not seem much good negotiating by accredited representatives if the claims of the men are the irreducible minimum, or if, when an agreement is effected by the representatives, additional claims are to be preferred. The position is an uncomfortable one for the leaders; and it certainly does not add to their dignity, nor attest their power. The leaders of the National Union of Railwaymen negotiated with the Government, and secured very generous standardization of wages terms for all grades of the workers, other than the locomotive men, who had been previously satisfied. The agreement, however, has been rejected by delegates instructed by branch meetings at which about as many minutes were devoted to explain and discuss the terms as hours were spent to the same purpose by the delegates in conference in London, who all the time had at the back of their minds the instructions from the branch meetings. The rank-and-file could not have properly

understood the terms of the agreement, nor what they were about in summarily dissenting from them. The Government has gone farther than any other Government has ever done in their efforts to ensure industrial peace on the railways; but there are sections of the railwaymen who, whatever is done for them, are anxious to get more. There may be details about the agreement that could be improved; but from the general lines of the exceedingly good terms offered, the Government ought not to budge.

What the Men Want.

It will be remembered that the agreement adopted the average pre-war rate of every grade of the workers as the basis of standardization; and the minimum of every man's wage was to be at any time 100 p.ct. in excess of the pre-war rate of pay. It was also agreed that a sliding-scale should come into operation, by which a reduction should be made as the cost of living descended; but the 100 p.ct. addition to the average of pre-war wages in any grade was the bed-rock. The men, however, want as the basis the highest wage in each grade on any railway, *plus* the full war rates. This they desire established as the minimum; and consequently the sliding-scale is not to work downwards, but only upwards if the cost of living further ascends. However much the cost of living recedes, wages should, they think, be maintained at the level to which they have been forced by exceptional circumstances; and if the cost of living unfortunately mounts still higher, the railwaymen would get still more. They also want the new 5s. war wage increase—making the war wages 38s.—to be retrospective to August last instead of January. At the same time, we fancy the men would be reluctant to reject positively the agreement arrived at. They recognize its value. But appetites have been sharpened; and they want to get all they can, and relinquish nothing. They are certainly doing their good part in maintaining the cost of living; and from this all grades of workers in all industries and occupations are suffering to-day.

Moulders and Miners.

The moulders have also voted against the recommendation of their leaders, that they should accept the settlement at which they arrived on their behalf; and so this distressing unemployment promoting strike still goes on. In the ballot that was taken, unfortunately only 27,344 men voted out of about 50,000 on strike, so that less than 55 p.ct. registered their views. Of these 9631 were in favour of acceptance, and 16,713 against. Had the whole 50,000 voted, the result might have been very different. The strike has already been disastrous for the Union immediately concerned; and the strikers are receiving strike pay on money borrowed from other unions. This cannot last long; and seeing that certain other unions took part as mediators in effecting the settlement which has been rejected, it is not an unlikely happening that financial succour may not be so readily forthcoming. The strikers themselves and their families are suffering great privations on an attenuated strike pay, and are spreading unemployment far and wide through withholding their work. This in turn is holding-up other home industries, and reducing the country's power of competition abroad. It is increased production that is wanted; but the, in some quarters, excessive demands of labour, and the withdrawal of labour through strikes, is crippling ability to produce. It is selfishness that rules to-day. Then there are the miners. They are always on the look-out for an opportunity to create fresh trouble. They are concerned now about the profits that are being made from exported coal; and they are asking that they shall be used to reduce the cost of living. Failing this, the Miners' Federation will demand a further increase of wages for the men. The profits from exported coal are being in large part employed to reduce the cost of household coal. Is not this a direct application to the reduction in the general interests of the cost of living?

A Wireless Press message from Russia states that experiments are being carried on at the Moscow Gas-Works for the production of gas from inflammable shale extracted from the deposits in the Simbirsk and Syzan districts, and that for a period of 48 hours gas has been supplied originating from this source. The composition of the gas renders it quite adaptable for heating and lighting. Experiments have also been made which show that tar can be extracted to the extent of 15 p.ct. of the total weight of the mineral employed.

PERSONAL.

On the 5th inst., at St. Wilfrid's Church, Harrogate, Mr. JOHN WILSON BROADHEAD, of The Hollies, Elland, Yorks, was married to Miss Marion Miller Roberts, daughter of the late Mr. James Roberts and Mrs. Roberts, of Ivy Leigh, Farnley Tyas, near Huddersfield. Mr. C. Fairweather, of Kilmarnock, was best man.

An interesting presentation took place at the Cardiff Gas Company's Offices, on the 5th inst., when Mr. H. H. LANGFORD was the recipient of a handsome canteen of cutlery. Mr. Langford was Outdoor Superintendent to the Company for eleven years, and has severed his connection to take up the position of Manager and Director of the Austin Foundry, Ltd., of Caerphilly. Mr. A. G. Barry, the present Outdoor Superintendent, was in the chair; and several felicitous speeches were made, all of which bore testimony to Mr. Langford's ability and character. Mr. H. D. Madden (Chief Engineer) referred to the harmonious relations which had existed between Mr. Langford and all the other officials, and said they trusted he would be successful in his fresh career. Mr. J. Evans (Meter Testing Department) remarked that the workmen always found Mr. Langford a real friend. The presentation was made by Mr. George Clarry, F.C.I.S. (General Manager and Secretary), who said that Mr. Langford was well esteemed by all—staff and workmen; and as a Company they regretted losing his services. He had brought the sunshine of his life into their midst, and shed good influences all around him. They wished him the greatest prosperity in his new sphere. Mr. Langford feelingly expressed his gratitude, and added that, but for the loyal co-operation of all, he would have "gone under."

Mr. THOMAS SETTLE, on account of his knowledge of the minerals of Devonshire, has been elected a member of the Council of the Mineral Development Association, which has been established to promote the development of mineral resources at home and abroad.

OBITUARY.

The death took place on the 1st inst., at the age of 74, of Mr. J. L. RUST, Manager and Secretary of the Caldicot and District Gas Light and Coke Company, Limited. The deceased was in the gas industry for the whole of his life, having been connected, among others, with the Stafford, Dudley, Buxton, Leeds, Bristol, and Chepstow Gas-Works. In 1906 he formed the Caldicot and District Gas Light and Coke Company, subsequently becoming Manager and Secretary, which office he held until his death. His two sons are also connected with the industry, at Barnet and Newport (Mon.) respectively.

WATER GAS RESTRICTIONS REMOVED IN FRANCE.

THE current number of the "Journal des Usines à Gaz" reports that official sanction has been given (by a decree dated Nov. 22 last) for the sale of water gas mixed with coal gas by all gas companies. Thus is removed the ancient prejudice which had hitherto existed in France against the use of water gas, and at the same time one of the chief, and quite justifiable, grievances of the French gas industry.

Up to the present time, Marseilles, Lyons, Roubaix, and St. Quentin were the only undertakings in the country which were allowed by their contracts to supply a proportion of water gas. But the authorities, realizing the saving of coal and labour which can be effected, have made this move, and have urged all undertakings immediately to get into touch with local authorities, and effect the necessary arrangements to have clauses added to their contracts allowing them to supply water gas. Prefects of districts are also urged to do all in their power to smooth-away any difficulties that may arise.

The regulations laid down by the Superior Council of Hygiene of France decree that the percentage of carbon monoxide in the mixture sold is not to exceed 15 p.ct. by volume; and the water gas is to be so carburetted with oil that the mixture sold has the characteristic odour of ordinary coal gas. It is estimated that if water gas in this proportion were universally adopted in France, the saving in coal would be 600,000 tons yearly. It is therefore small wonder that the authorities lay such stress on introducing the change with all possible speed; but it is strange how long the prejudice against water gas has lasted in France, when its adoption in other countries has been so widespread.

Mr. Alfred Fletcher, a Director of the Liverpool Gas Company, who died on Oct. 24, at the age of 78, left unsettled property of the gross value of £179,821, with net personalty of £101,716.

Mr. W. G. Adam, B.A., Chief Chemist to the Gas Light and Coke Company, will lectureon the "Bye-Products of Coal Gas Manufacture," before the Efficiency Club for Business and Professional Women, in the Conference Hall at the Central Hall, Westminster, at 7 o'clock on Thursday evening (the 15th inst.). Business and professional men will be welcomed.

GAS BILLS FOR 1920.

[Second Article.]

CONTINUATION is made to-day of the review of the Bills dealing in whole or in part with gas matters that have been deposited for promotion in the next session of Parliament.

The PONTYPRIDD DISTRICT COUNCIL, in a General Bill, desire further gas powers, including borrowing authorization to the amount of £25,000 for mains, plant, and other purposes in connection with the gas undertaking, for which sum repayment in thirty years is named. As from June 30, the Council ask for the right to charge a price for gas not exceeding 5s. 6d. per 1000 c.ft. Power is also included for the purchase and use of coke-oven gas. The supply of power gas is provided for in the usual terms. [*Parliamentary Agents: Messrs. Sharpe, Pritchard, and Co.*]

The REDCAR DISTRICT COUNCIL are asking for power to become possessed, under an agreement already effected, of the undertaking of the Redcar, Coatham, Marske, and Saltburn Gas Company; and to the agreement confirmation is sought. The agreement forms the first schedule to the Bill. Turning to this, it is seen that the issued share capital of the Company consists of £64,000; and there has been raised by the creation of mortgage bonds the sum of £5045. The Council propose to purchase the concern as it stood on July 1 last, except a sum equal to the total amount paid out in August for dividends for the half year to June last, subject to the payment and discharge by the Council of all the debts, liabilities, and obligations of the Company (other than those in respect of amounts due to the shareholders on account of their holdings, and other than the loan debt of £5045). The price to be paid is £115,000; and, in addition, the Council are to pay interest as specified on the various classes of capital from June 30 to Aug. 20 next, or the day of transfer, whichever is the earlier. Out of the money received, the Company are to extinguish the loan debt. Between the dates of sale and transfer, the business is being managed by the Company on behalf of the Council. The Directors are receiving remuneration on the same basis as before; and as to the Secretary-Manager, at the rate of £500 per annum up to Aug. 31 last, and at the rate of £600 per annum from that date to the day of transfer. Compensation for loss of office by the Directors and the Secretary-Manager is to be provided by the payment of a sum of £3000, which is to be divided among those entitled to it as the Company shall determine. The first clauses in the Bill are to confirm the scheduled agreement, and to empower the winding-up of the Company after the date of transfer. The limits of the gas-supply area are defined as the whole of the urban district of Saltburn and the parishes of Kirkleatham and Upleatham in the North Riding of the County of York. The gas-works maintenance clause provides for the conversion of secondary products, and the one-third purchase restriction is incorporated. The standard calorific power is put at 500 B.Th.U.; and the minimum pressure at 15-10ths. In the prepayment meter clause, a maximum charge for meter and fittings of 1s. 3d. is suggested, and with cooker 1s. 6d.; while the maximum charge for meter without fittings is unaltered at 6d. per 1000 c.ft. It is proposed that the maximum price of gas shall be 5s. per 1000 c.ft., "or such higher price per 1000 c.ft. as will not be more than sufficient, so far as can be estimated by the Council before the commencement of the period for which the charge is made, to enable the gas undertaking to be carried on without loss during that period." Further, the Council are not to be bound to charge for gas supplied by them beyond the district a less sum than 3s. 4d. per 1000 c.ft. Power to purchase crude or partially purified gas is included. As to borrowing powers, the Council desire for the purchase of the undertaking to borrow such sum as may be necessary, with a repayment period of 35 years; for the erection, alteration, and improvement of the works, £40,000, with a repayment period of forty years; for mains extension and improvement, £30,000, with a repayment period of thirty years; and for new services, meters, stoves, and fittings, any sum not exceeding in the whole £25,000, with a repayment period of fifteen years. [*Parliamentary Agents: Messrs. Torr, Durnford, & Co.*]

The RISCA DISTRICT COUNCIL include in their General Bill a short section referring to the gas undertaking. All the clauses, except one, are common to modern gas legislation; and the exception is that a maximum price of 7s. per 1000 c.ft. of gas is asked for. [*Parliamentary Agents: Messrs. Lees and Co.*]

The ROCHESTER, CHATHAM, AND GILLINGHAM GAS COMPANY are in Parliament for additional capital and borrowing powers. The preamble sets out the amounts authorized and raised as capital and by borrowing. The Company state in the preamble of the Bill that they have expended on capital account a sum largely in excess of the amount raised by them; and now further capital expenditure is needed. They ask for enlarged borrowing powers in relation to the capital converted and consolidated by their Act of 1906, and in respect of further capital to be raised under that Act. They also want additional capital powers. Turning to the clauses, the additional capital authorization sought for is placed at £200,000. Regarding the borrowing powers, sanction is asked to the borrowing of (*a*) £40,000 in addition to the £20,000 already borrowed under the powers conferred by the Act of 1906 in respect of the consolidated ordinary stock; (*b*) £32,300 in addition to the £10,000 already borrowed in respect of the additional capital raised under the Act of 1906; and (*c*) any sums not exceeding in the whole one-half of the amount of any capital for the time being raised, after the passing of the Act, under the powers of the 1906 Act, as amended by this Act. The amounts mentioned under (*a*) and (*b*) are to be without the certificate of a Justice of the Peace, and (*c*) with the certificate of a Justice of the Peace. In respect of the additional capital proposed by the Bill, the Company ask for borrowing powers up to one-half part of the amount raised and paid-up. Powers to issue redeemable preference and debenture stock are to be taken. Works and secondary products clauses are included, with the one-third purchase restriction. Sanction to hold annual meetings is sought. Many clauses of ordinary character appear; and towards the end is seen: "Nothing in this Act shall exempt the Company or their undertaking from the provisions of any General Act relating to the supply of gas which may be passed in this or any future session of Parliament." [*Parliamentary Agents: Messrs. Dyson, Bell, & Co.*]

The RUGBY GAS COMPANY are in Parliament for extensive powers. The demand for gas has increased, and is increasing; and so the Company desire to purchase lands in the parish of Bilton, and to construct there new works and a railway siding. It is also clear from the preamble that further capital powers are needed, seeing that the Company have not been in Parliament since 1882. Coming to the clauses, power is to be taken to compulsorily acquire the new lands; a period of three years being named within which to exercise it. The usual authorization is asked with regard to the use to which the lands may be put; and the secondary products clauses appear with the one-third purchase restriction. Land purchase by agreement is sought; and sanction to stop-up a footpath is desired. Power to construct a railway siding is to be exercised within five years; and in this connection, there is protection for the London and North-Western Railway Company. An extension of the limits of the area of supply is to include the parishes of Dunchurch, Church Lawford, and Long Lawford. A number of ordinary provisions appear, including the prepayment clause; but the Company ask to be allowed, as an alternative to the now ordinary terms, to charge "10 p.ct. per annum on the cost of the meter and fittings, whichever shall be the higher." As to capital, it is proposed to repeal the power to raise the unissued capital authorized by the Act of 1882, amounting to £4745 15s. 9d.; and the additional capital authorization asked for is £150,000. The Company are desirous that the borrowing powers over the whole of their issued capital shall be raised to one-third part. The right to issue redeemable preference stock or debenture stock is sought. Provision is made for a 7 p.ct. dividend on the ordinary capital, and 6 p.ct. on the part issued as preference. The standard price is put at 3s. 8d. per 1000 c.ft., with the sliding-scale operating on the usual terms. The reserve fund clause in the Act of 1882 is to be modified by the substitution throughout of "half year" for "year." Power is to be taken for the creation of a special purposes fund. Annual meetings are provided for. A clause is incorporated for the appointment of a Managing-Director; and various matters affecting profit-sharing are also dealt with on the lines usually adopted. The same applies to clauses regarding the establishment of a benefit fund. The first schedule shows that the land it is proposed to acquire at Bilton for new works has an area of 21 acres 7 perches; and it is situated on the Rugby and Leamington branch of the London and North-Western Railway. [*Parliamentary Agents: Messrs. Lees & Co.*]

In the Bill of the SALFORD CORPORATION, there are clauses referring to the sale of coke. In the case of sales of over 2 cwt. quantities, with delivery by vehicle, the seller is to send to the purchaser a ticket or note as nearly as may be according to the form in the third schedule to the Weights and Measures Act, 1889, or according to a form to the like effect. If default is made, or the quantity delivered is less than the quantity expressed in the ticket or note, the seller will be liable to a penalty not exceeding £5. Any default on the part of the person attending on any vehicle delivering coke will render him liable to a like penalty. For quantities of coke exceeding 14 lbs. but under 2 cwt., there is to be a metal label affixed to the top of every sack indicating the correct legal weight or measure. For any false statement as to the weight or measure, or any damping of the coke, or wilfully doing any other act by which the purchaser is defrauded, a penalty not exceeding £5 will also apply. Then there are powers as to requiring the weighing or re-weighing of the coke or the vehicles. The provisions, however, are not to apply to the sale and delivery of coke by the Corporation. [*Parliamentary Agents: Messrs. Dyson, Bell, & Co.*]

The next Bill is that promoted by the SHEFFIELD CORPORATION for, among other purposes, acquiring the undertaking of the Sheffield Gas Company.* In the preamble, it is submitted that "it is expedient that the undertaking of the Company should be transferred to, and vested in, the Corporation in manner provided by this Act, and that the Corporation should be empowered to supply gas throughout the city and the limits of supply of the Company, and that the other powers of this Act in reference to the gas undertaking of the Corporation should be conferred." The Bill provides that within three months of the passing of the Act, the Corporation shall give the Company notice in writing of their intention to purchase their undertaking; and thereupon the Company shall sell and transfer to the Corporation free from

* Since this review of the part of the Bill referring to the purchase of the gas undertaking was put in tpye, the Sheffield City Council have decided to abandon the scheme.

encumbrances for such consideration—being an amount of annuities—and on and subject to such terms, as may be agreed upon between the Company and the Corporation, or determined by arbitration. Provision is made for the Corporation taking over the stock and stores, &c., as well as the winding-up of the Company. A clause repeals the Acts and Orders of the Company, except certain provisions. The succeeding clause is to empower the Corporation to issue gas annuities, which will be payable half-yearly. The gas limits are to be those defined by the Company's Acts; and, in addition, so much of the city as now existing as is not included in the limits so prescribed, but excluding from the limits the portion thereof within which the Stocksbridge Gas Company are authorized to supply gas, other than the "joint area" referred to in section 41 of the Stocksbridge Gas Act of 1919. It is also proposed that all the powers of the Borough of Rotherham with reference to the supply of gas in any part of the city as now existing shall, as from the date of transfer, be repealed. In this connection, it is also provided that section 13 [Adjustment of Limits of Supply with the Sheffield Gas Company] of the Rotherham Corporation Act of 1904 shall, from and after the date of transfer, have effect as if the Corporation were referred to therein in lieu of the Sheffield Gas Company. The same applies to section 41 of the Stocksbridge Gas Act. The remaining clauses are of customary form and purpose. Among the financial provisions, power is sought to borrow the sum required for the purchase of the gas undertaking; the desired period within which the repayment is to be made being named as sixty years. The first schedule cites the provisions of the Company's Acts and Orders, which, it is wished, shall be excepted from repeal. [*Parliamentary Agents: Messrs. Sherwood & Co.*]

ELECTRICITY SUPPLY MEMORANDA.

We are very anxious to get the "Electrical Review" to deal without evasion with the coal conservation question, and the respective positions of the gas and electricity industries in relation thereto. So far there has been failure.

Fight and Refute.

Our criticisms of the articles on the subject that have appeared in its columns have never induced it to venture upon a positive reply. The last time was when a very curious effusion appeared from Mr. B. L. Klemens [see "JOURNAL" for Dec. 23]; and we showed he was seriously wrong in certain of his data and deductions. Now it is observed that the "Review" has a little comment in which it says: So long as Sir Dugald Clerk "affects to compare electrical energy—energy which is directly available for use, far more widely available, in fact, than if it were in the form of actual units of heat—with the potential heat energy which is admittedly present in gas, but which is not capable of utilization to a degree even remotely approaching that of electrical energy, he is laying a false scent, and his assertions must be fought and refuted. It was for this reason that we published Mr. Klemens's articles, which we believe to be substantially true." Very well. Then we invite the "Review" to fight and refute. We would point out for its information that these notes are read by many electrical engineers; so the invitation will be remarked by many of its own readers. In making the invitation, we would remind the "Review" that, to deal with the matter properly and honestly, it must take progress into account. The efficiency of all gas-consuming appliances must be that which represents the latest productions of gas apparatus makers; for it is on the latest productions, not the earliest, that the gas industry will in future be doing business. It must also take into account the newest methods of gas manufacture which are to-day available to every existing gas-works, be they large or small, and only await adoption as opportunity arises, without the construction of super-stations. We have a right to this, as it is observed that the electrical people are basing their calculations on a 20 p.ct. efficiency for electricity generation, while the average in the country to-day is only between 6 and 7 p.ct.—say, 7 p.ct., which means that there is an average loss of 93 and not 80 p.ct. Moreover, every electrical engineer knows full well that 20 p.ct. efficiency extending from John o' Groat's to Land's End is a condition which, if ever realized, can only be in very distant times. And Great Britain and Ireland is not covered with the fine electrical conditions existing on the North-East Coast. With these conditions and considerations in mind, perhaps our contemporary will now apply itself to the fight and the refutation.

There are two other points. When the "Review" speaks of Sir Dugald Clerk having opened a campaign, may we remind

Two Other Points.

it that the campaign was opened by some over-enthusiastic electricians and perfervid politicians who did not know what they were talking about when promising the public heating and cooking service by electricity at absurd prices when [the "when" needs emphasizing] the great "coal-saving" electricity scheme was fully developed. Of course, we must forgive people who did not know better, and were ill-advised. The other point made by our contemporary is that waste coal can be, and is, utilized by electricity stations. Admitted; but at what cost? There is trouble enough to-day in electricity stations through the supply of indifferent coals; and the use of "waste coal" would mean increased boiler house and plant capacity in order to bring the steam-generation capacity up to requirement.

The "Review," unfortunately for it, but fortunately in the cause of truth, is receiving some nasty knocks in its own columns. Last week we commented on

Attack the Waste Heat.

the articles by Mr. George Wilkinson, the Electrical Engineer of Harrogate, who confessed that the loss of heat in electricity generation is something of which the industry cannot be proud; and the inciting cause of the comments referred to in the preceding paragraphs is a letter, signed "Economy," in the columns of our contemporary. The writer says he has been for "a number of years" experimenting with a view to retrieving some of the 80 p.ct. of waste heat [why not go to 93 p.ct.?]. That is an interesting admission. "A number of years;" and yet without something is done in the way suggested by Mr. Wilkinson, there is no hope of any great improvement after the many years of labour. "Economy" puts a pertinent question: "Why," he asks, "instead of attempting to prove that you obtain more B.Th.U. by obtaining only 20 p.ct. effective energy from each pound of coal than the gas-works is capable of, why does not Mr. Klemens approach the question from a broad-minded point of view?" The question is vaguely put; still, as we say, it is pertinent. Gas-works can to-day produce a thermal efficiency four times the best that is accomplished by an electric station under the most favourable circumstances; and this difference is not lost in utilization for all the purposes to which heat is put in the home and factory. However, "Economy" points out that Mr. Klemens in his article (this is the common way in controversy on the electrical side) entirely leaves out of account, except coke and tar, the valuable bye-products obtained by gas-works from coal. "Economy" therefore appeals to the electricity industry to consider the matter from an economic basis. He believes that only by an exchange of ideas can the electricity supply industry cut into that deplorable 80 p.ct. waste, which is a sensible view.

The "Electrical Times" is hard-up. It turns to the results of a prize competition for a house designed for labour-saving,

Hard Up.

and to words put into the mouth of Miss Connie Ediss, in a scene in "Lord Richard in the Pantry," in which she appears with an electric range which gives her shocks; and this for the purpose of obtaining support for electric cooking and heating. The gas industry has no need to rely merely on printed words, or designs on paper, or on the witticisms of a playwright, and the artificiality of the stage, where what is the most practical is not always the most convenient. "Meteor" says that in the £400 house competition, the first prize was won by an arrangement designed for labour-saving, which (permit us to add) does not necessarily mean for economy or time-saving. In the kitchen there are an electric range and an electric copper—both instruments of torture sufficient to drive a housewife to a lunatic asylum. Fancy an electric range which can do nothing promptly or cheaply, and even the oven quickly loses its original efficiency. And in the oven such economy as is gained is only by keeping the whole time the joint in a flabby weeping condition, so letting loose (as analysis proves) a large proportion of the nutritious juices into the gravy-tin below. But an electric copper! Heaven defend the housewife who ever tries to save anything by that means—money, time, labour, or temper. The gas industry has no need of paper-drawn fancies of this kind. It can refer to actual experience in millions of homes, as well as to discarded electrical appliances. But "Meteor"—well he finds so much satisfaction in paper testimony and stage play that he has devoted to them a column of superlative piffle.

While there are some points with which we cannot agree in an article on "The Future of Electrical Development" in the "Times Engineering Supplement" for

A Sane Examination of the Position.

December, there is much in it with which we fully concur. It is an article contributed by an "Electrical Correspondent;" and its most striking feature is that it invites other electrical men to look facts squarely in the face. Referring to the current controversy, the writer alludes to "statements, written and spoken, that must be a source of considerable amusement to the gas interests." We assure him there are many such; and they are served up in our electrical contemporaries weekly. Their best energies in this matter are devoted to brushing aside scientific truths and ascertained facts, and presenting in their places fiction and postulation. Nothing of any value can come from such discussion. "Electrical Correspondent" has manifestly been reading these things, which are, as he puts it, a source of amusement to the gas interests. He finds, too, that many of the advantages claimed for electricity in connection with domestic appliances entirely ignore the question of cost. This is an unpardonable omission for engineers, to whom the financial aspect of a problem is of the first importance. The electrical interests dwell on things that electricity will do; but this does not alter the fact that only a small fraction of the community can afford the appliances or their use. He also alludes to the efficiency of conversion of the electrically extracted fraction of the heat energy of the coal into useful heat in electric appliances, and points out that this does not compensate for the initial advantage which gas obtains as regards the conservation of the heat energy of the coal. This is quite true; but "Electrical Corre-

spondent" must not run away with the false notion that the efficiency of modern gas appliances is as electrically represented. It is all very well to talk of 100 p.ct. efficiency with electric radiators, which have not 100 p.ct. efficiency when brought under scientific test; and even their radiating efficiency varies with types, and diminishes with age. Gas is used for a thousand-and-one heating purposes. For some of the heating purposes for which electricity claims consideration, the efficiency of conversion lies with gas, and not with electricity; and in other cases there is not such a very great difference. The cost of apparatus, too, has a bearing; and there again, gas has the advantage. "Electrical Correspondent" acknowledges further that the supply of a general demand for electricity for cooking and heating could only be carried out by the provision of an enormous amount of copper for low-tension distribution, by an inordinate multiplication of sub-stations and transformer pits, or by some system of high-tension distribution; and capital charges would adversely affect tariffs. It may be added that there would also be such a sacrifice of coal that the longer such general supply continued, the poorer the country would become. It is hopeless to expect that electric heating will ever be in general demand. "Electrical Correspondent" is of opinion that the future of electricity lies in the direction of power and lighting, and not heating or cooking. He holds that with electric power the efficiency may easily reach 85 p.ct.; while that of the gas-engine of the smaller sizes will be of the order of 15 p.ct. His knowledge is somewhat at fault. Gas has never had greater use for power than to-day. Manufacturers are now setting gas and electric power in their rightful positions—gas for constant loads and long hour-runs; electricity for intermittent use. In lighting, cost is in our favour light for light; so is the power of light distribution without accessories, quality of light, intrinsic brilliancy, and so forth. Yet gas men are not so foolish as to say that the electric light has not places and purposes for which it is the more satisfactory.

Flight of Power and Heating Costs.

Looking down the news items of the "Electrical Review" for the same number in which our contemporary spoke of fighting and refuting the assertions of Sir Dugald Clerk, we notice that the Urban Electric Supply Company has, despite the 10s. reduction in the price of coal used for the domestic provision of electricity, increased the prices of current as follows: At Ramsgate and High Wycombe—Power, first 100 units per quarter, 7d.; next 3000 units, 4d.; beyond, 3d. Heating, first 100 units per quarter, 4d.; beyond, 3d. At Grantham, after the first 100 units, there is ½d. difference in the power charges; and the heating charges are also ½d. less. At Glossop the figures are the same as for Ramsgate, excepting the "beyond" ones for both heating and power, which are 2½d. per unit. The Board of Trade have granted an Order to the Richmond Electric Light and Power Company, authorizing an advance in the price of electricity to 6d. for lighting, 2d. for heating, and 3½d. for power. Fancy a 3 KW. radiator running at 4d. per unit, or 1s. an hour; or even at 3d. or 2½d. per unit, or 9d. or 7½d. per hour. We are anxious for the "Electrical Review" to commence its fighting and refutation. By the way, on the same page in the "Review" as the increases in price, there is recorded a breakdown at Halifax, and an inadequate supply at Hull. At Kingston on Monday of last week, there was a cessation of supply; and the current was not restored until about seven o'clock in the evening. The Surbiton Railway Station was lighted by oil-lamps; and shops and residences not supplied with gas found the candle something that was not in any way to be despised, and that formed a very useful auxiliary indeed to the electric light.

Nos. 28 AND 30, GROSVENOR GARDENS.

Concentrating the Official Quarters of Gas Organizations.

THIS is what has been wanted in the gas industry for many years. But big, ambitious, influential, and potential as is the industry, it has never before made a move in this direction. It has been one of its old characteristics to let established conditions abide. But many old characteristics are being extirpated; and something more consistent with position and times is taking their place. Some men have dreamed of the gas industry becoming possessed of official headquarters with a meeting-hall large enough for all requirements—something to call the industry's own, and representative of its place and power in the country's organization and system. For a period, however, the time has passed for anything of the kind; and so we must have the next best thing. And the industry has got it at Nos. 28-30, Grosvenor Gardens, London, S.W. 1.

PRESENT AND PROSPECTIVE TENANTS.

It is an address which will often be written in the future, and to which many gas men will wend their way. It is an address that will have to be borne in mind—not yet for all the organizations that will become the tenants of the premises. It is hoped, however, that some time during the summer, all of them will begin their occupation. When this happens, there will be in what will then be practically one building the—

National Gas Council.
Federation of Gas Employers.
Institution of Gas Engineers.
British Commercial Gas Association.
National Benzol Association
National Benzol Company, Ltd. (with its different Departments associated with Sales and Distribution).
Sulphate of Ammonia Association (Sales Organization and Propaganda).

The four first-named organizations will not take up their tenancy until the summer time. There is disappointment over this; but the American Navy has work going on in No. 28 which it is not likely will be disposed of before June. This is the latest estimate—prior estimates fixed earlier dates. So from time to time, hope of quick possession has been dashed to the ground.

Meanwhile (and this is the reason for the present preliminary notice), despite the fact that decorators and workmen are about the place, the sulphate of ammonia and the benzol organizations, and the sales organization department of the British Commercial Gas Association, have taken up their residence at No. 30, Grosvenor Gardens, and that is where all communications referring to their work should now be addressed. If one wants to telephone to the Sulphate of Ammonia Association, one must ask for "Victoria 7250 or 7251;" or if one wishes to send a telegram, it should be addressed "Sulphammo, Sowest, London." If it is desired to telephone to the Benzol Company or Association, then it will be necessary to ask for "Victoria 9118;" or if a telegram has to be despatched, then it must be addressed to "Nabenzo, Sowest, London." The postal, telephone, and telegraphic addresses of the other organizations will remain as of old until due notification is made. The sooner, however, there can be complete occupation, the greater will be the facilities for carrying on, smoothly and effectively, the general work of the industry.

LOCATION AND ACCESSIBILITY.

Nos. 28 and 30, Grosvenor Gardens, with their stone-built fronts, solidly constructed interiors, large light rooms, and the accommodation generally, are well adapted for the purposes for which they are destined. The two buildings are connected by doorways on each floor. Once fashionable residential houses, they will soon be places of great activity for the gas industry. Big, however, as the combined premises are, they will not be too large for the organizations and their work. The premises are well situated; and we congratulate those who had the making of the selection upon their choice. The industry left (a bit late in the day) this work of obtaining for itself suitable premises, in lieu of scattered offices which did no gas organization justice, and the gas industry grave injustice—due true to its own past supineness and want of initiative. A fit place in or near Great George Street, or in closer proximity to the Houses of Parliament is to-day altogether out of the question. Suitability and location had therefore both to be considered in the prevailing circumstances; and the next best thing to being in the centre is to be as near as possible to it. The premises that have been taken (on a lease for 38 years) are not far removed from the Houses of Parliament, Government Departments, and the centre towards which all statutory industries move and look. The end of Victoria Street opens out into Grosvenor Gardens. A stone's throw away are the Victoria Stations of the London, Brighton, and South Coast Railway, the South Eastern and Chatham Railway, and the District Railway. The Piccadilly and Brompton Tube (Hyde Park Corner Station) is only a short walk from the new premises; and the tubes all over London are inter-connected. The buses that pass Victoria Station traverse all parts of London. Thus both position and accessibility are all right.

AN INSPECTION OF NO. 30.

The Sulphate of Ammonia Association and Sales Organization and the Benzol Association and Distribution Company being in occupation at No. 30, we asked permission to look over the premises, and there was an opportunity for doing so last week. We had the pleasure of meeting there Mr. E. J. Fottrell, B.Sc., Assoc.M.Inst.C.E., the Manager of the National Gas Council, the Assistant Manager (Mr. S. S. Ogilvie, who is a barrister, and has in hand the work of the Federation of Gas Employers), and the Secretary of the Council (Mr. W. J. Smith), who between them kindly gave all the information desired as to the plans for the utilization of the premises as they stand to-day. Though No. 30 is in the hands of the decorators, one can see right well that there is an intention to make the fullest possible use of the premises, and to organize the work to the best advantage within the limits set by the buildings themselves, and in connection with each body and every department to bring to bear upon the work and the service for the industry all the efficiency of modern method. Old-fashioned methods have to go, even in the routine work of our gas organizations. They are altogether out of harmony with the pressure of the times, and the multiplicity of subjects that have to be dealt with.

In all there are in the two buildings 34 rooms in which the work of the gas industry will in future be conducted. But an attempt

will have to be made to group each organization's rooms as far as possible, in order to realize the greatest efficiency and economy of time. This will be the most difficult problem. However, when the two buildings are occupied and connected, it is probable that they will be treated as one, with a single entrance, and a waiting and a general reading room and reference library common to both. The Board or Council room on the first floor of No. 30 will also be common to all the organizations, for meetings of Councils and Committees, and for conference purposes between the administrative bodies of the organizations, or for interviews. It is a fine room. If the space could be afforded—this is a matter of policy which will have to be determined as plans mature—the removal of the partition wall so as to make this room and its fellow in No. 28 into one room, would give sitting accommodation for about 300 people. That is a suggestion in mind; but it cannot at present be settled, because there is doubt as to sacrificing room for only occasional use. There will be accommodation here and surroundings of a character to and into which the organizations of the industry will not be ashamed to invite anyone to a conference, and which will be well adapted to any purpose of the kind. General meetings of members in larger numbers than this (when in London) will, of course, as before, have to be held in some place handily situated in Westminster.

No. 30 is similar in all respects to No. 28, excepting that the latter has the convenience of a lift; and therefore it is most probable that, when the organizations are all housed, the main entrance will be at No. 28. In the basement of No. 30, are seen large rooms, which are being converted into store-rooms. One room would make a fine dining room; and there is a kitchen with a commodious range in it. But no kitchen could exist in company with gas organizations that was not properly equipped with gas apparatus, including hot-water circulators. Arrangements will be made so that the whole staff of the different organizations can, if they so desire, have both lunch and tea on the premises; and probably a sort of club will be formed for the purpose. However, nothing is going to be left undone that can be done to expedite work, and maintain a high standard of efficiency.

Of course with the workmen about and their equipment, and the occupied offices only temporarily furnished and not properly organized, one cannot picture what it will all look like when the plans are complete. But a daily acquaintance with the buildings by partial habitation and use will enable ideas to develop to the best advantage; and so perhaps the gradual inflow of the gas industry's work will help to make the arrangements more perfect right away from the beginning of the complete occupancy.

We have said the rooms are spacious and light. This applies almost generally. A few of the back rooms are not large compared with the others; but they make comfortable, light offices for one or two persons. On the ground floor of No. 30, one looks into the first office, which is tenanted by the Benzol Company; the staff in this particular office attending to the sales in the London Division, which is quite a large area. Next door, Mr. F. H. Holland was found busy with his staff on the work of the Sales Development Branch of the British Commercial Gas Association. It is unnecessary at present to enter into a detailed description of all the rooms. So passing to the next floor, one is introduced to the Board room, about which fine apartment we have already said sufficient. In it no doubt momentous decisions regarding gas policy will henceforth be taken; and the voices of men highly responsible to the gas industry will often be heard. In the adjoining room, the Sulphate of Ammonia staff are busily at work; and passing through the room, we find the Manager of the Association (Mr. F. C. O. Speyer) very much occupied, but able to spare a few minutes for conversation. Mr. Speyer and Mr. H. Jones (the Secretary) are the only permanent executive officials of the Association at present in London. On the second floor, are seen more rooms devoted to the work of the Benzol Association and Distributing Company. Mr. A. J. Tibbitt is the Manager, and Mr. P. G. Somerville, who is the Secretary of the Association, is also the Assistant Manager of the Company. On this floor is the Benzol Traffic and Equipment Department of the Company, and the general offices of the Association. Both the Manager and the Secretary have their offices here. Further of the rooms on the third and fourth floors are devoted to the work of both the Benzol or Sulphate of Ammonia organizations. But we will not specify too exactly, as there may be a redistribution of offices as the premises are better known, and ideas expand as to how best to accommodate work to available space. On the third floor is a room which is later on going to contain the telephone switch-board.

While not attempting specific description at present, we have said enough to show that, with this concentration of gas organization work, operations are going to be of an extensive and very far-reaching character. The concentration itself is a valuable scheme. In it the President of the National Gas Council (Mr. D. Milne Watson) has taken very large personal interest; and we are sure—as he is—that it cannot fail to bring about a better organization and co-ordination of the general work of the industry, and facilitate its transaction. And with Grosvenor Gardens the gas industry will progressively develop its relations.

On Saturday, the 17th inst., members of the Scottish Junior Gas Association (Eastern District) will visit the New Grange Meter Works of Messrs. Alder and Mackay, where they will meet at 2.30. The firm will afterwards entertain the party at tea.

THE EXTRACTION OF ETHYLENE FROM COAL GAS.

A REVIEW OF MR. BURY'S PAPER—"JOURNAL," Dec. 30, p. 718.

[COMMUNICATED.]

JUST as during the early days of the great war it became incumbent on gas engineers to pay special attention to toluene, in order to meet the urgent demands of our armies in the field; so now in these days of war against waste it will perhaps be necessary that gas manufacturers should cultivate a more or less intimate acquaintance with ethylene—a constituent of coal gas whose value in providing alcohol has been set forth in the paper recently read to the Cleveland Institution of Engineers by Mr. Ernest Bury, of Skinningrove. All praise and credit to Mr. Bury for the remarkable pluck and perseverance displayed in the researches already carried out, and for the pioneering lead he has given in clearing the road for what all must hope will be another successful advance along the line of bye-product recovery.

The writer recollects some amusing inquiries as to the nature of toluene. For example, one gas "expert" asked, "What is this toluol? Some say it is a metal, and others say it looks like cheese. What is it?" Bearing this in mind, it will first of all be well to take some pains to define the chemical and physical characteristics of this newly-found treasure.

Ethylene is a colourless, invisible gas, possessing a faint, rather sweet odour. It was discovered in 1795 by four Dutch chemists whose names it may be permissible to omit. It has the formula, C_2H_4, usually written constitutionally $H_2C = CH_2$, indicating that two of the carbon bonds are unsatisfied. It thus readily forms additive compounds, adding on hydrogen to form ethane, C_2H_6, hydrobromic acid to form ethyl-bromide, C_2H_5Br, and so on. The additive compound that concerns us most at the present time is ethyl sulphate, $C_2H_5HSO_4$, which ethylene forms with sulphuric acid, and from which alcohol is obtained. Ethylene is almost as heavy as air (sp. gr., ·971). It is easily liquefied. Its critical temperature, above which it cannot be liquefied, is 13° C. (55½° Fahr.). When cooled to − 1° C., it liquefies under a pressure of 42½ atmospheres. Its melting point is − 169°, and its boiling point − 105°. The specific gravity of the liquid is only ·386 (at 3° C.).

It burns with a bright, luminous flame. Mixtures with air, or especially oxygen, are very explosive. When subjected to strong heating, it decomposes into carbon, methane, acetylene, &c. By weak oxidizing agents, it is converted into ethylene glycol, HO − CH_2 − CH_2 − OH. Strong nitric acid converts it into oxalic acid. It combines with certain metallic chlorides, such as those of iron and platinum. It has a calorific value of 1578 B.Th.U. gross, 1472 net, and has thus about three times the value of coal gas as a heating agent. One volume of ethylene requires three volumes of oxygen or fifteen volumes of air for complete combustion. Ethylene can readily be made in small quantities by dropping absolute alcohol on to phosphorus pentoxide, placed in a glass flask.

To the gas analyst it is well known that fuming (Nordhausen) sulphuric acid—oleum as it is now generally called—is a good absorbing agent for ethylene and its homologues, as well as for benzene and its homologues. This absorption takes place quite readily in the cold. One would, therefore, feel inclined to say that the use of fuming sulphuric acid, containing from 10 to 20 p.ct. of volatile SO_3, would greatly facilitate the complete extraction of ethylene from coal gas. Mr. Bury appears to have obtained only 70 p.ct. washing efficiency with ordinary concentrated sulphuric acid. Basing one's judgment on analogy and large-scale experience of gas washing—including gas washing with sulphuric acid and oleum—one would feel justified in expecting an efficiency of extraction of 90 to 95 p.ct. with a single washer, if oleum were used. Unfortunately, this would mean the installation of an oleum plant, if a very small one; and oleum plants of suitable design are not to be had for the asking.

It should here be explained that as an oleum plant's function is to produce dry sulphur trioxide, SO_3, there would, with its help, be no need to concentrate, by the ordinary methods of evaporation, the acid weakened in the process of absorption and hydrolysis. All that would be necessary would be to use the weakened acid to absorb the dry sulphur trioxide, and thus again restore its strength. The surplus acid made by this process could, of course, be used in the sulphate plant. Further, the sulphur dioxide given off by the partial reduction of the sulphuric acid that takes place would be dry, dust-free, and arsenic free, and would therefore be suitable, without further treatment, for the manufacture of oleum. It is a fact that well-designed oleum plants can produce acid of 90 p.ct. strength (and over) more economically than the ordinary chamber and concentration plants; and at the present time 20 p.ct. oleum can be bought on the market at a figure based upon acidity 25 p.ct. lower than 95 p.ct. acid. As against the use of fuming sulphuric acid, on the other hand, there is the argument that one does not, when starting a new process, wish to pile-on the capital costs.

The chief trouble in the whole business, it seems to the writer, would arise through the necessity of eliminating moisture from the coal gas. The weight of water to be removed by the sulphuric acid is very considerable. Thus, assuming a yield of 10 million cubic feet of gas per diem, it may be calculated

that the content of aqueous vapour under the usual condition of saturation is as follows: At 15° C. (59° Fahr.) the vapour tension of water = 12·68 mm. of mercury, giving 1·67 p.ct. of aqueous vapour in the gas. This is equivalent to approximately 8200 lbs. of water per diem, to remove which, by concentration of the acid in the ordinary way, would probably cost about £10 a day. At 5° C. (41° Fahr.) the vapour tension of water is only 6·47 mm. of mercury, and is thus practically halved; and this reduction would be accompanied by a corresponding diminution of cost of concentration. If an acid concentration plant, rather than oleum, must be adopted for keeping the acid up to strength, it is all the more imperative for the successful operation of the process to cool the gases to be treated to the lowest temperature possible. It would probably be profitable even to remove the water by refrigeration.

Equally serious is the dilution of the sulphuric acid by the action of steam in the process of hydrolysis and distillation of the alcohol. There is no exact information as to how far dilution is necessary. No doubt, Mr. Bury has thrashed this matter out. If heavy dilution is necessary, so as to bring down the strength of the acid to something like 74 p.ct., then the advantages of oleum or dry sulphur trioxide recede more into the background. Heavy dilution will, in any case, entail serious costs in concentration of the acid, and it is chiefly in this respect that one entertains fears as to the success of the process.

The writer is tempted to draw up a balance sheet of the whole attractive scheme, but fears to do so for want of sufficient data. He might venture to put down the gross income on a 10 million plant at £50,000 per annum. The loss in heat units by absorption of ethylene might be valued at £8000 per annum. The cost of concentrating the sulphuric acid would probably cost at least £10,000. Labour, repairs, and maintenance, &c., would amount to another £10,000. Capital charges might absorb as much as £7000. Basing the estimates on the modest extraction figures quoted by Mr. Bury, a fair return for the capital outlay should still be expected.

There are other aspects of this question of the separation of ethylene from coal gas which also appear attractive. Ethylene would be a valuable gas in many ways—for internal combustion engines, for welding (instead of acetylene), for lighting railway carriages, &c. The ease with which it can be liquefied lends it to portability in steel cylinders; and it would not be surprising to find it used extensively in the near future as a substitute for petrol for motor traffic. Furthermore, ethylene is the primary substance required in certain chemical processes—for example, in one of the best modern processes for manufacturing indigo. The chlorine derivatives of the ethylene series are of great value as rubber solvents. One looks forward, therefore, with great interest to the publication at no distant time of further results of Mr. Bury's large-scale researches on the utilization of this most important constituent of our familiar coal gas.

It need hardly be remarked that there is no essential difference between coke-oven gas and ordinary coal gas. The ethylene content is, generally speaking, probably about 20 p.ct. higher in the latter; but it is never so high as 6 p.ct,, as quoted in text-books on organic chemistry, though in the olden days of gas making, when retort temperatures ruled about 1600° Fahr., it must have approached this figure.

No doubt gas chemists will receive from a perusal of Mr. Bury's paper great stimulus in the direction of research on ethylene extraction; and if, apart from the welcome production of large quantities of alcoholic motor spirit, ethylene can be profitably isolated for application to the industrial purposes for which it is eminently suitable, an advance of very great importance will be achieved.

PRO-RATA REDUCTIONS IN PRICES OF GAS AND COKE, FOLLOWING COST OF COAL.

By NORTON H. HUMPHRYS.

ON the face of it, any suggestion of a direct proportion between the prices of gas and coal is so preposterous that some readers of the "JOURNAL" may be inclined to reject it as being not worth serious consideration. But the experiences of gas undertakings over the last five years go to show that assumption of this nature does not hold good. A proposition that is obviously absurd or unjust in the opinion of the practical man may be viewed in a different light by those in authority, or be passed, on grounds of national expediency, with little regard for the rights and interests of parties more directly concerned. Equity and practical ability have not taken a prominent place in the past, so it is not safe to assume that they will do so in the future. A gentleman appointed to the position of head of a Government department very rapidly acquires an autocratic turn of mind. Onerous restrictions upon prices and profits have been accepted with a meekness that has led to gross misapprehension as to their actual and severe effect. Gas undertakings have been too quiescent, because they did not wish to be in any sense unpatriotic. The general body of consumers have been indifferent, not appreciating the fact that their interests were directly concerned, and some have been satisfied to saw at the trunk end of the branch on which they are sitting. There has been nothing equivalent, for instance, to the outcry raised on behalf of coalowners and vendors against a proposition to set back profits to a pre-war basis, though a three quarter pre-war profit has been forced on gas shareholders—and that on the face value, without regard to auction clauses and premiums. The auction room and the highest bid is not the exclusive source from which colliery shares can be obtained.

This unjust onslaught on preserves protected by the Special Gas Act or Provisional Order is to continue for two years certain; but signs are not absent that endeavours will be made to place it on a more permanent basis. Here is sound reason for prompt and decided objection to any suggestion in the direction of *pro-rata* reduction in price of gas as compared with the cost of coal, or differentiation according to the purpose for which the gas is used. And if the advances in price, necessitated not by larger profit but by increased expenditure, had followed similar lines—if the Government had not encouraged and introduced the supply of qualities of coal previously unheard of, by removing every vestige of competition or liberty of purchase, and if the cost of the materials and labour that go to make up items of expenditure other than coal had been maintained at an even pre-war level—then there might be some show of equity and soundness in such proposals. Prices of gas and coke, however, have suffered so much restriction that in many cases the business has been run at absolute dead-loss for months on end. Coke has already been set at an artificial value, frequently below its worth in an open market; while advances in cost of items other than coal, originated by war conditions, have not ceased with the declaration of peace. The suggestion of an eminent authority, that the standard or initial price should be based on the cost of coal, may be to some extent responsible for the *pro-rata* idea, though nothing was said to the effect that the price of gas and the cost of coal had a direct ratio. This emphasizes the necessity for a proper understanding of the position.

How does the gas industry stand to-day? Reserve funds are depleted to near vanishing point; repairs and renewals are greatly in arrear—due in some cases to the scarcity both of materials and labour, which made their completion an impossibility, and in others to lack of the necessary funds. Important extensions were, and yet are, indefinitely postponed for want of the required capital, accentuated by the enormous increase in cost of material and labour. The *pro-rata* suggestions not only infer that these strained and unnatural conditions are just, normal, and maintainable, for any length of time; but, in effect, propose to increase the present exorbitant loading to an unsupportable extent. Anything like a fair proportion between gas and coal cannot be based on panic conditions. It must be founded on figures that will admit of a division of profits sufficient to maintain a ready sale for new issues of capital at slightly above par—and this after making full and proper provision for repairs, renewals, maintenance, and depreciation. But the proposals under review go far beyond ignoring these truisms, and adjourning consideration of the real position *sine die*. They mean nothing less than absolute insolvency and confiscation, and as such offer an excellent weapon for syndicalists.

The example [next page] from actual practice will illustrate the facts concerned. It is selected as a fair typical case, because the variation in consumption has been so slight as not to affect comparisons; and there is no complication due to the manufacture of other than straight coal gas. The expenditure and income per ton of coal carbonized and per 1000 c.ft. of gas accounted for are respectively set side by side; a fifth column has been added showing the effect of a reduction in the price of gas and coke proportioned to a fall of 10s. per ton in the cost of coal; and a sixth column shows the application of the "Instructions" lately issued. This is on the assumption that the cost of items other than coal remains unaltered. But several recent advances have not come into full swing over the entire year; and a rise in cost of railway transit is impending. Apart from coal, the expenditure, so far from decreasing, is on a steady upward grade. The year 1919 20 will yet more strongly emphasize the matters now being set forth.

The normal pre-war profit of about 10d. per 1000 c.ft. is reduced to a miserable 4·2d. in 1919, chiefly due to deterioration in the value of coal supplied, and delay with the Board of Trade, who take action months in arrear, though advances in cost are either immediate or retrospective, and do not take notice of contingencies that are obviously in sight. The readjustment in column 5 converts this small profit into a dead loss of 3·1d. per 1000 c.ft.

"Cost of coal" is usually taken as meaning the inclusive cost laid in store, and includes rail, water, or road haulage. Of these, the cost "at pit" is the only item affected. The even drop of 10s. at the pit will have a very uneven effect on the cost of coal in store, according to distance from colliery and transit facilities. A gas-works situated on the top of a colliery may pay 20s. per ton at the pit and 2s. 6d. delivery charges—total, 22s. 6d. at store, which would be brought down, by 10s. pit reduction, to 12s. 6d., or nearly 50 p.ct. Another works, 100 miles distant and under other disadvantageous circumstances, may buy the same coal at the same pit price, but find that it costs 40s. in store. In this case the reduction means only 25 p.ct. on the cost. On the *pro-rata* basis, the reduction in the price of gas and coke would be similar in each case.

Much dissatisfaction has already been caused by the widely varying effect of restrictions, which may mean a mere trifle to one undertaking, and little less than ruination to another, according to geographical accident, or the selections of coal control, and "*pro rata*" will add fuel to the fire. The less fortunate undertakings are discredited because the public do not understand the

Year ending Sept. 30.	Per Ton of Coal Carbonized. 1913.	1919.	Per 1000 C.Ft. of Gas Accounted for. 1913.	1919.	Gas and Coke Reduced *pro rata* on 10s. Less Cost of Coal.	Coal Control Instructions.
	£ s. d.	£ s. d.	s. d.	s. d.	s. d.	s. d.
Gas	1 10 8·3	2 1 3·4	3 3·9	4 7·7	3 2·0	3 5·9
Rent	2 7·3	3 1·8	3·4	4·2	4·2	4·2
Products	6 11·6	11 6·0	9·0	1 3·5	1 0·3	1 0·3
Balance, being loss					3·1	—
	2 0 3 2	2 15 11·2	4 4·3	6 3·4	4 9·6	4 10·2
Coal	17 11·0	1 11 6·6	1 11·2	3 6·6	2 5·0	2 4·6
Purifying	2·6	—	·3	—	—	—
Wages	2 7·7	5 10·0	3·5	7·9	7·9	7·9
Salaries	3 0·3	4 1·4	3·9	5·4	5·4	5·4
Repairs	6 5·4	7 9·5	8·4	10·5	10·5	10·5
Rates and taxes	1 8·4	3 1·3	2·2	4·2	4·2	4·2
Sundry	5·6	5·6	·6	·6	·6	·6
Balance being profit	7 10·2	3 0·8	10·2	4·2	—	1·0
	2 0 3·2	2 15 11·2	4 4·3	6 3·4	4 9·6	4 10·2
Net cost of coal (coal less products)	10 11·4	1 0 0·6				
Net cost of gas (gas *less* profit or *plus* loss)			2 5·7	4 3·5	3 5·1	3 4·7

position, but regard it as merely a matter of "good" or "bad" management. That differentiation of gas or coke, according as its use for domestic or industrial consumption, is absurd and impossible cannot be too prominently set forth. Are gas companies to accept the mere declaration of the purchasers? If the onus of proof is to fall on them, they will need an army of private detectives, and power to enter the premises of the users. And if the parties concerned do not agree, who is to decide? I do not envy the responsibilities of the authority deputed to act as umpire. In the large manufacturing districts, where factories and dwelling houses are separate buildings and have separate meters, discrimination may be possible; but not so in poorer quarters or in small towns, where the bulk of the consumers conduct both classes of consumption in the same building and off the same meter. Many classes of consumption do not admit of such distinction. For instance, is the lighting of a railway station or a shop "domestic" or "industrial"? And is "industrial" confined to distinct processes—such as the raising of steam or the melting of metal?

The "Instructions" lately issued by the Coal Controller constitute a gross injustice to gas undertakings, and do not benefit consumers in the long run, because:

I. They presume that the prices of gas have been increased on *pro ratâ* lines.

II. They do not take into account the losses due to the reduced prices of coke, or the steady advances in items of expenditure (the effects of which are not yet evident) as applied to an entire year's working.

III. They tend to perpetuate the present shattered state of the gas industry—due to Government restrictions and war conditions, as being reasonable and normal.

A compromise to the effect that increases in the price of gas during 1919 should be cancelled, would be open to the objection that they were necessitated by a general increase of expenditure, of which coal is only one item; and that all others tend to advance rather than decrease. The application of a cast-iron rule to all alike is an attempt to create artificial conditions, and as such is bound to be a failure, like numerous other similar attempts.

The figures above quoted are not exceptional, in that the "Instructions" limit the solvent existence of the concern to the extent of the reserves. The profit earned during the past year was 4·2d. [column 5], of which 1·8d. was required for standing charge of interest on loans, leaving 2·4d. available for dividend—equivalent to about 2 p.ct. on the face-value of the shares. The "Instructions" reduce the utterly inadequate earning to 1d. —not sufficient to pay all standing charges. The balance must be paid from the reserves; and when these run dry the concern will be insolvent.

Government interference in the price of gas is both uncalled-for and superfluous. Gas undertakings are quite willing to give to the consumers at the earliest possible moment the full benefits due to reduced expenditure; but under their existing parliamentary powers, they are enttiled to apply at least part of such reductions to the rehabilitation of the repairs and renewals, restricted profits, and depleted reserve funds.

Attention to these special points is much more important—and that in the interests of the consumer as much as of the undertaking—than an immediate reduction in the price of gas.

The Halifax Gas Offices have been selected for the meeting next Saturday afternoon of the Yorkshire Junior Gas Association; when Mr. J. M'Lusky, of Halifax, will deliver his Presidential Address. Afterwards the members will inspect the installation of Drakes' vertical retorts, now in course of construction; and during the evening an opportunity will be afforded of visiting the new gas show-rooms.

SOUTHERN JUNIORS AT THE OLD KENT ROAD.

No matter how often visits may be paid to the Old Kent Road works of the South Metropolitan Gas Company, there is always something fresh to be seen and something new to be learned; and though many of them had been there more than once before, there was not a moment during which interest flagged throughout a tour of inspection last Saturday afternoon by between eighty and ninety members of the London and Southern District Junior Gas Association, under the President, Mr. S. B. Chandler. On arrival, they were received in the main offices by Mr. G. M. Gill, the Chief Engineer of the Company; and immediately, by the manner in which the smallest details in connection with the visit had been arranged, evidence was forthcoming of the thoroughness with which everything is done on the works. It is a big place; and the afternoon daylight at this period of the year is short; so that, though an early start had been decided on, it was impossible that a complete tour could be made in the time at disposal. This being so, two routes were mapped-out. Six parties were made up, the guides being Messrs. T. Curr, T. S. F. Gibson, W. Payne, G. Grosse, F. A. Frost, and A. H. Andrews; and to two of these parties those more particularly interested in the distribution side of the gas industry were requested to attach themselves—their tour including the stove, district, and meter shops, while the other parties were engaged in different parts of the manufacturing plant beyond the retort-house.

Before entering the retort-houses—and this must be mentioned, for it is in the truest sense a part of the works—there was a short pause at the football field, where Metrogas "A" team were playing a match before an audience whose enthusiasm no weather seemed able to damp. In connection with the carbonizing, there was much information to impart; and to what the members learned while actually in the houses, Mr. Gill added a great deal in a subsequent informal address which is reported below. With the account of the visit to the works last summer by the Southern District Association of Gas Engineers [see "JOURNAL," July 8, pp. 75, 79] still fresh in the minds of readers, it is unneccessary to say much about the works now. In some notes prepared for the visit, it was stated: "The latest addition to this system of working (and this has been applied to two houses) is the dividing-up of the sixteen settings in each house into four units of four settings. Each unit has its own governor; and when charging or discharging takes place, the particular unit only is affected by a reduced vacuum which is maintained while the doors are open. The governors are operated from the stage by means of a wire cable. It is proved by results obtained that the gas not only is of good quality, but the make per ton is also increased. The inerts are maintained at from 8 to 11 p.ct., the gas made per ton at about 13,000 c.ft. of 560 B.Th.U. gross, the make per retort 16,000 c.ft., coke made for sale 10½ cwt., tar 9 to 9½ gallons, and liquor 40 gallons of 8 oz. strength. The houses are frequently under a pressure of 1 in. in the foul main, in order that all bad doors and other leaky joints may be rapidly detected." When slacking-out, No. 1 unit is reduced to low vacuum 1·10 in.; the vacuum being reduced by the action of placing a weight on the bell of the governor attached to a wire rope operated from the stage floor. As soon as the pusher starts work on No. 1 unit, No. 2 vacuum is reduced. When the charger starts in No. 1, No. 3 unit vacuum is reduced. On the charging machine passing to No. 2 unit, 3·10 in. vacuum is put on No. 1, and No. 4 unit vacuum reduced. Then, as No. 3 and 4 units are charged, 3·10 in. vacuum is put on. This completes four retorts in each; and while the machines are travelling back to No. 1 unit, the vacuum is again reduced, and the same procedure is carried out, completing eight retorts in each unit.

Later all the parties met in the burner-shop, where they found much demanding close attention, and where Mr. D. Chandler, in a short address, laid stress upon the importance to gas undertakings of retaining the lighting load. Then there was a move to the staff dining-room, where hospitable preparations had been made. After tea,

CARBONIZING PRACTICE AT THE WORKS.

Mr. GILL said he wished to extend a hearty welcome to them all, and to express his regret that the weather had been so bad as to interfere to some extent with the inspection of the works. He hoped that the next time they came to Old Kent Road things would be better in this respect. It seemed to him that it might be of some advantage to the members if he took up a few minutes of their time by explaining one or two points which probably when they were in the retort-house were not quite clear to them. What they tried to do in the South Metropolitan Company was to make a standard gas. It was not yet, by any means, standardized to their liking; but this was what they had in view, and had now been practising more or less for a number of years.

Referring to a series of coloured diagrams on the wall, he said these showed the kind of gas the Company had been supplying since the middle of 1918 to date. Each diagram had a horizontal dividing or datum line, upon and above and below which the results were indicated by red and black colouring—red re-

presenting what were looked upon as "good" results, and black what were regarded by them as being "bad." Mr. Gill pointed out that in the make per ton diagram the datum line was 12,500 c.ft. Some improvement was shown for the past year. The next was make per ton after deducting non-combustibles or inerts. The datum line was 11,250 c.ft. They kept to about 11,500 c.ft. For calorific power, the datum line was 550 B.Th.U.; and they kept over this all the time. About 560 B.Th.U., or something like that, was the average. The next diagram was British thermal units per ton of coal carbonized. The Company only made coal gas; and it was not complicated in any way by being mixed up with the water gas. The datum line was 7,000,000 B.Th.U. per ton of coal; and they kept above this without very much trouble. Sometimes it was very much over. For illuminating power, the datum line was 14 candles; and they maintained about 14½ candles. The candle power per ton was arrived at by multiplying the make per ton by the candle power. The next one was nitrogen, for which the datum line was 8 p.ct. Lately, they had gone to 9·7 and 9·6 p.ct. He would not enter into the reasons for this, but had no doubt the percentage would come down very quickly. The datum line for carbon dioxide was 2 p.ct.; and they were able to keep well under something like 1½ p.ct. In the case of oxygen, the datum line was 0·2 p.ct. The same reason that he had already alluded to had caused an increase in oxygen to 0·4 p.ct. As a rule, they were well under this. The datum line for non-combustibles or inerts was 10 p.ct. The increases referred to had caused a rise to 11·8 and 11·4 p.ct., which were very bad figures for their Company. The specific gravity ranged from ·43 down to about ·41. The average was something like ·42 sp. gr.; and this was a very important point often overlooked.

Make per retort, continued Mr. Gill, was a matter to which they had been giving close attention during the past year. The datum line on the diagram was 15,000 c.ft.; but they had increased the actual figure to something over 16,000 c.ft. per retort. The B.Th.U. per retort was arrived at by multiplying the make per retort by the calorific power. The datum line was 8,400,000; and they ran to over 9,000,000. The members might be interested to know how the Company had increased the make per retort. They had not altered the period of carbonizing. They had stuck to ten-hour charges all through, but had increased the weight of the charge. What the members had seen that day were about 10½ cwt. charges; and it was found that they could be burned off very well in ten hours. Charges of coal were apt to vary more than people sometimes realized. It needed quite a trained eye to detect a charge below the normal being put in; but there was a big variation between different machines, and it was by getting machines to work better and faster that an improvement could be effected. They were getting in extra coal which before was not being put in, but which only needed to be put in to be burned off and give them more gas. Again, they had brought together all their carbonizing foremen and engineers, and for a long time held weekly meetings, at which all carbonizing points were brought up and discussed, and results were announced. It was possible thus to tell them exactly what was wanted of them, and what the Company considered good working, and to fix standards in all branches of carbonizing. As a consequence, they had secured the very considerable increase in make of gas per retort to which he had referred. This had saved them from the necessity of extending their retort plant, because previously they were getting very short indeed of capacity; whereas now they had a margin, and could really make all the gas needed with four works out of six—that was, two shut-down.

Referring to yet another diagram, Mr. Gill remarked that carbonizing was an all-important subject; and with coal having trebled in price, they had got to get more out of it, if they were to compete with electricity and make anything like cheap gas. The diagram represented expenditure incurred to make 1000 c.ft. of gas. It totalled to something like 5s. 8d., without deducting anything for residuals. Out of this 5s. 8d., no less than 4s. was spent in the retort-house. This showed the absolute necessity of giving very much more attention to the retort-house than they did in the past. Outside the retort-house, on the works, there was only 6d. involved.

There were two other diagrams which referred to the Old Kent Road works. One, Mr. Gill said, showed the gas made in the outside producers. They were able, with this outside plant, to make a better quality producer gas than was possible with small producers under settings. The datum line was 21 p.ct. of carbon monoxide; and generally speaking they could keep it over this. The diagram was based on the averages of all tests taken over a week; and in this period there would certainly be over a hundred. In the last few weeks, they had gone to about 28½ p.ct. The variation was due to the method they had of working their retort-houses. Not having water-gas plant, they had to shut-down retort-houses. During a spell of mild weather, they might have on some days 6,000,000 or 8,000,000 c.ft. plant shut down; but instead of shutting-down in the ordinary way, they worked double this amount of plant on a twenty-hour carbonizing period. They put the charge in, and carbonized it in double the usual time—twenty hours, instead of ten hours. It was found that when they worked these outside producers on half-duty, they could not get the same quality of producer gas. In the waste gases 19 p.ct. of carbon dioxide was about the average. The maximum and minimum ranged between about 20 and 18½ p.ct. It was possible to keep the settings very uniformly heated with outside producers.

Another point he might mention was that they were working the retort-houses with unsealed dip-pipes. They simply regulated the pull with the retort-house governors. When the doors were open, there would be a pull of something like $\frac{1}{10}$ in. in the foul main; but in the ascension-pipe there would be about level gauge. With this method of working, it was possible to so control the pressure on the retorts as to keep it at an absolute minimum. Each unit of four settings had its own retort-house governor; and by this means when charging was going on, the pull was so regulated that no air was going up the ascension-pipes; but when the retorts were charged, the doors were shut and the pull was increased. In actual practice, they were working the house under a vacuum—that was to say, when the retorts were shut there was a vacuum inside. Another diagram referring to the hydraulic main from 6 a.m. to 6 p.m. showed the vacuum in the main to be something like ¾ in., except when the draw was in progress. At the mouthpiece, which indicated the conditions under which the coal was being carbonized, it was seen that there was a vacuum practically all the way through. This was the way in which they were able to work with unsealed dip-pipes. One did not get bad gas under these conditions, if everything was kept tight. They were, in fact, able to obtain without any trouble at all the quality of gas he had mentioned. There was more trouble in getting the gas down than in getting it up.

This was the principal point he wished to speak to them about. Some people thought that, in keeping the inerts down, they were wasting a lot of gas; but those who said this did not understand the elements of carbonizing. It was quite clear that in working the retorts in the manner he had indicated, one could not lose much. Working under these conditions, they could increase the B.Th.U. per ton to something like 7,400,000. It might be thought that to keep the retort-doors tight involved great expenditure; but it did not. When retorts were under repair, the lids were made tight on their machines. They faced them, with the mouthpieces, perhaps every three to five years; but when once this had been done, there was no trouble at all. In the four retort-houses they had been through that day, there was one man on each shift who did all the hydraulic main work and the retort-doors as well. There was no one else on it at all. A supply of retort-lids was kept all faced-up; and as soon as one became faulty, it was replaced. A supply of about fifty retort-lids would last all the winter. He had tried to work out the cost of facing and adjusting the doors to keep them in this condition; and it came to about 1½d. per ton of coal carbonized. This was all it cost them. It was ridiculous to think it an expensive fad to keep down the inert gases. This was really the point he wished to make.

A VOTE OF THANKS.

The PRESIDENT said the South Metropolitan Company had always been to the front in the application of scientific methods to the manufacture of gas and its distribution. Had there been any doubts as to their great efforts in this direction, the afternoon's visit would have dispelled them. In going round the works, one was very much struck with the scientific methods that were employed. Thoroughness in all departments seemed to be the watchword of the Company. From what they had seen and heard in the burner shop, it was evident that the Company would be the very last in the world to suggest that their lighting load was going. Some undertakings thought rather lightly of the future of their lighting load; but he personally believed that, provided such methods as they had seen that afternoon could be applied, there was absolutely no reason why they should not retain the whole of the lighting load, and even extend it in face of competition. The labour situation generally was serious; but apparently the Company had tackled it the right way. Very keen competition existed between the men in the retort-houses, who vied with each other in obtaining the best results. He believed the winner had the privilege of flying a flag over his retort-house for a stated period. On behalf of the members he took this opportunity of offering hearty congratulations to their late ordinary member and now honorary member Mr. Gill on the proud position he had gained in the gas industry, and of thanking him for the interest he had always taken in the work of the Association. He proposed a hearty vote of thanks to Dr. Carpenter, the Directors, and Mr. Gill for so kindly having them there, and for the hospitality extended to them, and to the guides who had taken them round and fully explained everything.

Mr. D. C. CROSS (Lea Bridge) seconded the vote, which was carried with applause. He said that every time he came to Old Kent Road he was more impressed with what he saw. Both the works and the Company were models of efficiency. The retort-houses were a revelation to all gas men. Things he had previously learned there had made a marvellous difference in his own works. Whatever gas men did, they must aim at maintaining the same state of efficiency over the whole 24 hours. Their gratitude was due to the Company and to Mr. Gill for imparting so much information upon the finer points of carbonizing.

Mr. GILL, in acknowledgment, said it had been a pleasure to show the members everything they had in the works, and the guides had taken on the work with alacrity. Any gas men who belonged to the Association would always have a welcome at Old Kent Road; if they wanted information on any point they had only to ask for it. The Company considered it their duty to help the gas industry, and any member of it, to the best of their ability.

Mr. A. F. BROWNE, called upon to support Mr. Gill, said he wanted to express, on behalf of the Company and himself, the great pleasure they all felt at meeting the members of the Association on this occasion. Some years ago, in its earlier days, he had the honour of being officially connected in some way or another with the Association; and when present at the meetings he had been much struck with the zeal and enthusiasm with which the members were evidently filled. The war had intervened, and he presumed therefore, as in other matters of life, their proceedings had been more or less interfered with; but nothing could have given him greater pleasure than to hear that after-

noon that the membership was increasing by leaps and bounds, and now totalled 220—of whom some 40 p.ct. were engaged on gas-works, and 60 p.ct. in the distribution department. It was a hard-working and admirable Association, and seemed to him to be on the crest of a wave of prosperity. Let them go on and prosper. The kind manner in which Mr. Chandler and Mr. Cross had expressed the thanks of the visitors had been very flattering to Mr. Gill and the chiefs of the various departments.

There still remained another item of the enjoyable programme that had been prepared; and on rising from the tables, the visitors made their way to the Livesey Institute, where special arrangements had been made to show something of the social side of the undertaking, in the form of a physical display. This comprised some good boxing bouts and a particularly neat exhibition by a young lady of the art of "jiu-jitsu." This part of the proceedings had been organized by Mr. A. Coleman, late Sergeant-Major Gymnastic Staff, ex-Heavyweight Catch as Catch Can Champion, and Middleweight Græco-Roman Champion.

CHEMICAL INDUSTRIES IN GERMANY.

Before a crowded meeting of the London Section of the Society of Chemical Industry, held at Burlington House, W., on Monday evening of last week—Mr. Julian L. Baker presiding—addresses were given on "Chemical Industries in Germany," by Mr. E. V. EVANS (Chief Chemist to the South Metropolitan Gas Company) and Dr. G. S. WALPOLE. Both proved by what they said that they had utilized to the full their powers of observation during the time they spent in Germany; and both, being ready and witty speakers, closely held the attention of their audience throughout. The addresses (during which a series of lantern slides were thrown on the screen) were followed by a brisk discussion, in which some further points were brought out. Dr. Walpole began his remarks by declaring that he thoroughly agreed with everything that had been said by Mr. Evans, who preceded him; and so we confine our report to a summary of the address of Mr. Evans, who is, of course, known to a large number of "JOURNAL" readers.

In the first place, Mr. Evans stated that the outstanding impression gained during a visit of inspection to the large chemical works of the Rhine Valley—which included the works of the Bayer Company, at Leverkusen, Meister Lucius and Bruning, at Höchst, the Badische Anilin und Soda Fabrik, at Ludwigshafen and Oppau, and Griesheim Elektron, together with a large number of smaller works—was that of a huge and highly efficient organization temporarily paralyzed. There was seen well organized and fully equipped plant, known to be capable of supplying 80 p.ct. of the world's requirements of dyes in pre-war years, which was found to be in a good state of repair and ready for operation, but lacking at the time of the visit the necessary raw materials and efficient labour. The latent potentialities of such an organization, it was suggested, can only be fully appreciated by actual inspection of these idle plants; and when consideration is also given to the special facilities afforded the industry owing to its situation on the banks of the Rhine—namely, the excellent transport facilities, the power supply, the proximity of an almost inexhaustible source of soft water, and many other assets which are both natural and acquired as the result of years of work—it is realized that the presence of such an immense potentiality in the world cannot be ignored.

An inspection of the works demonstrated how assiduously the German has studied and applied scientific method to the various branches of business activity; and no little importance was attached to this factor in accounting for the success which has been achieved. The valuable part that engineering has played in the chemical industry of Germany was accentuated. Engineers have found it worth while, in collaboration with chemists, to devote their attention not only to the manufacture of special apparatus required for operations peculiar to the chemical industry, but to utilize various alloys, acid-resisting materials, new filtration media, &c. The sympathy that has existed between the engineer and the chemist, and the degree of service rendered by engineers to the chemical industry, is perhaps one of the most outstanding features which is thought to contribute materially to the success of applied chemistry in Germany.

The author, after having analyzed many of the points which were considered to contribute essentially to the past supremacy of the organic chemical industry of Germany over that in this country, stated that it was far from his wish to create or encourage the "German bogey." It was, however, necessary to face facts; and though the effort of British firms at present undertaking the manufacture of organic products deserved the greatest praise, it must, of course, be realized that the present attainment of Germany represents the work of forty years. It cannot be said that the English industry has had five years in which to resuscitate itself. The country has been at war; and the few firms which were allowed to continue the manufacture of colours had to devote their energies largely to supplying the requirements in dyes of the fighting forces of this and other countries. In addition to this, the impedimenta in the form of scarcity of apparatus and of labour, and the fact that the raw materials required were often those which had of necessity to be controlled for the manufacture of explosives, have all contributed to render progress in this country extremely slow.

It was considered, however, of the highest importance that the present position should be reviewed with care. While these huge organizations exist in Germany for supplying almost the whole of the world's pre-war requirements of dyes, Great Britain, Switzerland, America, and even France, were doing their utmost, not only to become self-supporting in the organic chemical industry, but to create a valuable export trade. In view of the fact that all these extensions were being made at a period when the cost of material and labour was so materially in advance of that of pre-war times, and that much of the German and Swiss capital had already been largely written-down, it would appear to become of the highest importance that immediate steps be taken by the British Government to ensure some form of protection to its organic industry. Such a course will doubtless be taken by the Government, if they are serious in their desire to foster the industry and prevent the recurrence of a similar calamity to that in which this country found itself on the declaration of war. Even putting aside the rather important question as to whether there will be room for the great extensions that are contemplated in so many countries, and assuming that the organic industry in this country is tuned to the degree of efficiency which existed in Germany in 1913—which is certainly not the case—it still becomes necessary to prevent the importation of German organic products manufactured in pre-war plant, and which may be advantageously imported into this country owing to the low exchange value of the mark.

Mr. Evans stated that he was of opinion that the creation by the Board of Trade of a Trades and Licensing Committee was sound in principle, and would have secured adequate protection to the key industry in this country, had it been created on the scale which the nature of the work demanded. A few experts were chosen as members of the Committee, and they gave in an honorary capacity as much time as could be spared. The task, however, is a stupendous one, and requires a complete organization of experts whose business it is to obviate the importation of dyes required by the user but manufactured in this country. It is no small question to adjudge between the relative values of colouring matters; and the main difficulty experienced by the Trades and Licensing Committee was the inordinate amount of work arising from this differentiation, owing to the complicated nomenclature under which various materials are imported into this country.

In conclusion, the author stated that there still existed in this country a number of firms willing to help in the manufacture of the organic products required. A great financial risk is involved in building or extending plant at the present moment; and it was suggested that, unless a remedy for these difficulties be quickly formulated by the Government, it was not to be anticipated that considerable progress would be made in the manufacture of new products.

Prevention of Accidents in Gas Plants.

Dealing with the prevention of accidents in connection with gas plants, Mr. J. F. Conner, Safety Supervisor to the United Gas Improvement Company, says a review of cases reported shows that the causes responsible for the greater number of accidents are due to the simple hazards found in all industrial establishments. The safeguarding of machinery and the installation of other mechanical devices for the prevention of accidents is unquestionably a necessary measure in any well-ordered plant; but in many cases the guards cannot be made absolutely fool-proof; so that finally the greater reliance for preventing accidents must be placed on human agency. If we are to continue to look forward to a reduction in the accident frequency, greater efforts must be made to educate the workman to know the dangers that beset him and others, from carelessness, thoughtlessness, and inattention on his part, and to arouse and maintain the accident prevention spirit in him. How best to reach the workman by educational propaganda, is a matter of opinion. Reasoning with the men collectively is usually attended by good results. The problem, to Mr. Conner's mind, should first be brought convincingly to the attention of the man higher up—the man directly in charge of the operation. If he meets it, as he should, in a spirit of serious interest, and by precept and example sets the standard for his subordinates, lets it be known that he is keenly alive to any failure or disinterestedness on their part to shoulder their duty, the indifference (if any) of the foremen and sub-foremen will quickly vanish, and those impositions of responsibility will be showing greater activity towards preventing accidents. The interest they show is bound to be reflected in the workmen; and there will come a sub-conscious awakening of the prevention spirit in the workmen. This is the dominating factor in preventing accidents.

At a meeting of the Institution of Petroleum Technologists at the Royal Society of Arts next Tuesday (5.30), Mr. Harold Moore, M.Sc.Tech., A.I.C., will read a paper on "Spontaneous Ignition Temperatures of Liquid Fuels."

Mr. W. J. Rees is to read a paper on "Coke-Oven Bricks and Refractory Materials" before the Midland Section of the Coke-Oven Managers' Association, on Saturday, the 31st inst. The meeting is fixed for 3 o'clock, in the Department of Applied Science, St. George's Square, Sheffield. The February meeting will be devoted to the answering by specialists of questions that may have been submitted in writing to the Hon. Secretary (Mr Gerald H. Lant) by the 20th inst.

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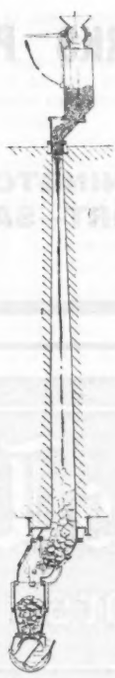

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A STUDY OF THE FORMS IN WHICH SULPHUR OCCURS IN COAL.

By A. R. POWELL and S. W. PARR.

A bulletin bearing the above title has just been issued by the Engineering Experiment Station of Illinois University.

In opening, the authors state that while carbon, hydrogen, and oxygen are generally considered as being the three important elements in coal, sulphur often forms a large part of the coal substance. In Illinois coals the sulphur often weighs as much as, or more than, the quantity of hydrogen; but the behaviour of the substances is radically different. While iron pyrites is undoubtedly the chief inorganic sulphur compound found in any great quantity in coal, there are many indications that organic sulphur compounds also form a large part of the total sulphur. The nature of these organic compounds, and the amount of sulphur so combined, however, has never been determined prior to this investigation. Since the organic sulphur had its source in the protein sulphur of the plant and animal life from which the coal was formed, it is probable that these compounds in the coal are degradation products of the original material. The purpose of the present investigation was not only to determine some relationship between the amounts of the various forms of sulphur in coal and the residual sulphur left in the coke, but also to determine the nature of the sulphur retained in the coke.

A study of the data thus obtained suggests the following conclusions:

(1) The sulphur of coal occurs in four characteristic forms—two of them organic and two of them inorganic.

(*a*) If the resinic organic type is shown to be organic sulphur by its lack of an ash, its presence in the portion of the organic material soluble in phenol indicates its association with that substance.

(*b*) The humus organic sulphur is shown to be organic by the very small amount of ash in the compounds in which it occurs. These compounds are shown to be closely related to humus substances by their chemical action.

(*c*) The pyritic or marcasitic sulphur is present as FeS_2 as indicated by the iron-sulphur ratio when the pyrites is oxidized and taken into solution.

(*d*) The sulphate sulphur is shown to be such by the fact that it dissolves in dilute hydrochloric acid as sulphate without preliminary oxidation.

All four forms have been definitely proved to be present, and only these forms exist in coal since the combined percentages account for all the sulphur. Free sulphur was not found in any of the samples of coal tested, and is presumably absent except in unusual cases where it might occur in small quantities as a decomposition product of pyrites.

Some of the sulphur, probably the pyritic, is gradually oxidized to the form of sulphate; one of the chief factors in this reaction being the length of time standing. An excess of air has no very decisive effect upon oxidation—in fact, coal if kept in a tightly stoppered flask oxidizes freely; the reaction being apparently hastened by the presence of bacteria or some catalytic agent. The influence is not evident at first, because of the large amount of free oxygen present in the flask.

The quantity of soluble sulphate formed by the reaction is less than it would be if the amount of soluble iron is taken as a criterion; and this suggests the union of some of the oxidized sulphur with the organic matter of the coal. The experimental data also suggest that when coal is coked the sulphate sulphur is retained by the coke, but in some form other than inorganic sulphate—that the pyritic sulphur is partially volatilized and a portion is also left in the coke, probably as sulphide. All the pyrites is decomposed. The resinic sulphur is left in the coke, but in a form different from that existing in the coal, and the humus sulphur volatilizes partly, but some remains in the coke in a changed form.

The forms of sulphur in the coke were also studied, but could not be identified. A small part of the sulphur exists as sulphide, and the remainder is probably in combination with carbon. This last form is extremely stable to strong acids, oxidizing agents, and heat, but readily gives up its sulphur as hydrogen sulphide when subjected to the action of nascent hydrogen. During the coking process, secondary reactions between constituents of the coal and the decomposed sulphur compounds affect the quantity of sulphur retained by the coke.

The analytical methods developed for the determination of the different forms of sulphur were as follows: Sulphate sulphur, as determined by extracting 5 grammes of coal (ground to 100 mesh) with 300 c.c. of 3 p.ct. hydrochloric acid for 40 hours at a temperature of 60° C. The extract is filtered, and the sulphate sulphur in the filtrate determined by barium chloride. The coal residue is then covered with nitric acid (1 : 3) of specific gravity 1·12, and allowed to stand at room temperature for four days. The mixture is then filtered, the acid driven off by evaporation to dryness, and the residue taken up in some water and hydrochloric acid. The pyrite sulphur now in solution, together with the iron, is determined in the usual way.

For the resinic sulphur 0·5 gramme of the finely powdered coal is placed in a flask fitted with an air condenser. Twenty-five c.c of phenol are poured over the coal, and the extraction allowed to proceed for twenty hours at a temperature of 140° C. (preferably by electric oven). The contents of the flask are next filtered through a Gooch crucible, and rinsed with alcohol and ether. The residue in the crucible is mixed with sodium peroxide and fused. The sulphur determination on this residue gives the portion of the sulphur not extracted by the phenol.

The humus sulphur is determined by the difference between the sum of the other three forms and the total sulphur in the coal. A direct determination may be made by extracting the coal with ammonium hydroxide, after preliminary treatment with concentrated nitric acid. This method is applicable only to the softer coals, the structures of which are fundamentally changed by the nitric acid treatment. For this method, 1 gramme of the finely-powdered coal is treated with 15 c.c. of concentrated nitric acid for some thirty minutes. The mixture is then diluted, filtered, and washed. The filter paper containing the residue is put into 25 c.c. of strong ammonia (sp. gr. ·90) and allowed to stand for several hours. It is then diluted and filtered through a large fluted filter. The filtrate is evaporated to dryness, and the dry residue fused with sodium peroxide. The sulphur in the fusion represents the humus sulphur.

The percentages of the different forms of sulphur found is shown in the following table:

Sample No.	A Total S.	B Sulphur as FeS_2.	C Sulphur as Sulphate.	D Total Organic Sulphur by Difference. A—(B + C).	E Organic Sulphur Soluble in Phenol.	F Difference between Total Organic Sulphur and Phenol-Soluble Sulphur.
1	2·68	1·39	0·04	1·25	0·42	0·83
2	2·18	1·58	0·17	0·43	0·15	0·28
3	0·64	0·17	0·00	0·47	0·20	0·27
4	2·14	0·71	0·05	1·38	0·34	1·04
5	1·20	0·40	0·25	0·55	0·16	0·39
6	5·00	2·03	1·31	1·66	0·77	0·89
7	3·31	2·06	0·01	1·24	0·50	0·74
8	1·02	0·80	0·01	0·21	0·10	0·11
9	1·40	0·75	0·02	0·63	0·21	0·42
10	0·94	0·31	0·02	0·61	0·12	0·49

It is seen from the table that no relationship whatever exists between the amount of sulphur extracted by the phenol and the amount calculated to be present as organic sulphur, except that the latter is always considerably greater than the former. The difference in results may be due to any one of several conditions. The phenol may not extract all the organic sulphur compounds, or the sulphur may be present in some undetermined inorganic form. The standard of comparison has, moreover, not been definitely proved correct, for the iron considered to be pyritic iron may be combined with more sulphur than the theoretical amount for pyrites, or it may be combined with less sulphur, as in coal which contains iron silicate.

Development of the Gas-Engine.

Some little time ago, Mr. Dana G. Griffin read a paper on gas-engines before the South Central Gas Association, which suggested that there are many possibilities for gas-engines to-day; and as a result of what he then said, the Chicago "Gas Record" asked him to write further, so that gas men might have his views on the subject of gas for power as a means of further expanding their industrial business. This he has now done; and in the course of the article he makes some references to the troubles of the early inventors. A little consideration of what actually occurs in a gas-engine cylinder at each explosion will, he says, show that the early engineers had troubles of their own to contend with. Platinum, the most infusible metal used commercially until very recently, melts at about 1700° C. The ordinary temperature of cast-iron flowing in a cupola is about 1200° C. A temperature very usual in a gas-engine is 1600° C.—a dazzling white heat. The whole of the gases filling the cylinder are at high temperature. If it were possible to see the interior, it would appear to be filled with a blinding glare of light. At first glance, it seems strange that such temperatures could be used with impunity in a working cylinder; but here the convenience of method becomes evident. The heating being quite independent of the walls of the cylinder, by the use of a water-jacket they can be kept at any desired temperature; the metals themselves not exceeding the boiling-point of water by more than a few degrees. While the present state of the gas-engine has received the stamp of commercial approval, it is interesting to know that not yet have its more wonderful possibilities been fully explored. With a modern gas-engine, a thermal efficiency of 27 p.ct. is easily obtainable, leaving the residual heat units diffused approximately as follows: Radiation, 3 p.ct.; exhaust losses, 38 p.ct.; water-jacket losses, 32 p.ct. It is by an ingenious device that we may soon see the major portion of the heat units recovered from the existing circulating losses and converted into useful energy in the shape of steam. Already a sufficient number of installations have been made to demonstrate the practicability of this heat recovery system.

REGULATING DISTRIBUTION PRESSURES.

In a paper, entitled "Regulating Pressures from Transmission or Pumping Mains into Distribution Mains," which he presented to the American Gas Association, Mr. G. T. MACBETH said his object was to bring out a few points in connection with the so-called "high-pressure distribution" encountered in his experience with the system of the Westchester Lighting Company, who supply a district including several cities, towns, and villages. The district roughly is 6 miles wide at one end, 15 miles wide at the other and 15 miles long, and has a population of about 390,000. It contains over 500 miles of distribution-main, and 75 miles of pumping-main. Gas is sent out from five stations at an initial pressure not exceeding 5 lbs. per sq. in. In the immediate vicinity of each station the gas is distributed under holder pressure. Outlying holder stations are inter-connected by high-pressure mains. The pumping-lines are laid so as to pass through the larger villages where low-pressure systems have been installed. Along the route of the pumping-mains, consumers are served from the mains direct through service governors. Small villages remote from holder stations, where the concentration warrants, are supplied with low pressure from one or more district governors. The operation of this system has proved very flexible. The outlying holders are filled in off-peak hours, and the low-pressure distribution systems are boosted as required during peak hours.

PUMPING PLANT.

Up to 5 lbs. pressure, the equipment used is a rotary or positive exhauster, directly connected to a heavy-type of steam-engine. Beyond this pressure, it is desirable to instal reciprocating compressors. When operating up to 5 lbs., the horizontal type of exhauster is preferable, as the bearings on the shafts of the impellers have better support. The pumping units have a capacity equal to the maximum consumption.

The engines are provided with the usual automatic governor, and are also equipped with a modified "Huntoon" governor, which controls the speed of the engine so as to maintain a constant pressure at the outlet. The float or chamber of the governor is sealed with mercury, and is placed as near as practicable to the valve in the steam-line. A small receiver is placed in the pressure-line to the governor, to prevent the transmission to the governor of fluctuations caused by the impellers of the compressor.

An automatic valve and gas bye-pass are installed around the compressor, to ensure at least holder pressure on the outlet of the compressor in case the engine should stop or break-down. By the use of the governor for regulating the speed, and by the automatic bye-pass valve, the labour required for operating the compressor is reduced to a minimum. The outlet pressure can be fixed or varied, as desired. It is possible, by exercising due care, to supply the small holders along the lines without materially affecting the pressure on the line.

GOVERNOR-PITS.

Governor-pits are divided into two general classes: Principal or main supply governor-pits and pressure-reinforcing governor-pits. Where governors are set at low points in the main, drip-pots are installed on the inlet and outlet. Ordinarily the drip on the bottom of the governor will take care of the condensation which it collects. The inlet, outlet, and bye-pass valves on governors are located in the street outside of the pits, and are controlled from the surface. An additional gas-valve is placed on the outlet of the governor inside the pit, which is used in connection with Kellogg-Crowell automatic pressure control apparatus. When supplying isolated districts which have no other source of supply, the governors are set in duplicate. Where districts have more than one supply, a single governor is set.

The Reynolds Regulator Company have developed a special diaphragm for the dash-pots on their governors, to replace the old mercury seal. This apparatus works very satisfactorily, even when the pits are filled with water; and it is cheaper than the mercury seals. Recording-gauges with weekly charts are connected at the inlet and outlet of each governor. The gauges are placed in boxes mounted on poles on the outlet ventilating pipe, above the ground. Recording-gauges set in damp-proof boxes placed inside the governor-pits do not give satisfaction.

The automatic Kellogg-Crowell pressure control is employed for automatically increasing pressure on the outlet-side of the governor during periods of maximum send-out. The apparatus operates as follows: A form of Venturi tube with side connection at its throat is connected around the outlet-valve of the governor. The flow of gas through the Venturi tube reduces the pressure under the diaphragm of the control governor and the dash-pot governor connected to the main governor. By reducing this pressure under the control and dash-pot governor diaphragms, the main governor will open and give more pressure. The amount of reduction of pressure can be controlled by increasing or decreasing the flow of gas through the Venturi tube. This is accomplished by closing and opening the extra valve or outlet of the governor. In some cases, the governor outlet-valve needs adjustment from four to six times a year, depending on the variation of the load with the different seasons. This apparatus has automatically increased the outlet pressure from 3½ in. to more than 6 in. during the hours of maximum demand.

Reynolds modified service-regulators are installed where individual consumers are served direct from pumping-mains. The modification consists in substituting a valve larger than that usually supplied with the high-pressure regulators.

Holders on pumping-lines are equipped with inlet-valves, so arranged that the holders can be filled without lowering the pressure in the main to any extent. The holder inlet-valves open gradually as the holder starts to go down, which allows sufficient time for the pumping apparatus equipped with the Huntoon governor to speed-up and maintain the pressure.

It has been found that 7 in. is the minimum pressure permissible at the governor-inlet; and it is desirable at all times to maintain a pressure not lower than 10 in. at the end of the pumping system. Governor-pits are visited regularly twice each week for inspection, and for maintaining pressure recording-gauges.

The inlet and outlet connections to the governor are made of wrought-iron pipe where they pass through the wall of the pit. The ends of the wrought-iron nipples are up-set to form a bead for caulking into the cast-iron hub. Each main supply governor pit is equipped with a set of tools, kept in a locked box in the pit. The tools permit the inspector to make any ordinary repairs and adjustments on his inspection rounds. In some cases the inlet, outlet, and bye-pass valves are located in the governor-pit; and it is the practice to remove the valve-wheels, and hang them on the walls, where they are chained and padlocked.

The first governor was installed twelve years ago. There are now fourteen main supply governors, and as many re-inforcing governors, operating throughout the system. The high-pressure is supplied by three pumping-plants, and furnishes gas over the seventy-five miles of pumping-main.

VALUE OF THE CHEMIST ON GAS-WORKS.

At last year's Convention of the American Gas Association there were two papers which emphasized the value of the chemist in connection with gas-works plant.

THE VALUE OF THE CHEMIST IN THE LARGE PLANT.

Mr. Edward J. Murphy, of Brooklyn, who contributed the first paper, regarded the matter from the point of view of the large gas-works. He said that, though gas manufacture has been entwined with chemistry since its infancy, it has been only within recent times that any serious application has been made to the industry. The chemical work in a gas plant used to be very limited in scope—consisting mainly of the analysis and testing of gas, coal, coke, and, in some cases, candle power and impurities. The last few years, however, have looked upon the gas-plant chemist from another view-point, since it has come to be recognized that the very foundation of gas manufacture rests upon the working of certain laws of physical chemistry. It is not inferred that the proper design of mechanical equipment is of no importance; but, as Dr. Rittman once stated, "the finest equipment in the world, designed with the utmost mechanical precision, but without regard for the laws which govern the reactions carried out in it, is likely to be less useful than apparatus of the most wretched mechanical construction, which does consider the chemical reactions involved." The chemist, then, finds his greater value in ascertaining how to control the reactions peculiar to the gas industry and the application of this knowledge to the plant. In other words, his greatest work is research on the economical use of raw materials and the greater yield of products consistent with the proper quality.

While these important points are occupying the chemist's attention, there is at the same time in every large gas plant a certain amount of routine and plant work to be done which is just as important in its own sphere. He is called upon to test coal, coke, oil, water, purification material, ammoniacal liquor, and the finished product, gas. Plant-control testing is also required of him—such as blue gas analysis, tests on tar and ammonia scrubbers, purifier-boxes, tar and cyanide extractors, total sulphur in the finished gas, boiler flue gases, pyrometers, &c. Work of a general analytical nature on such substances as cement, fire-brick, new purification material, holder paint, and numerous other items has to be taken care of.

All this work has definite value, without which it would be impossible to determine quality or performance. Without the analysis of a coal or coke, there would be no means of determining the moisture, volatile matter, fixed carbon, and ash. The heat value of these fuels could not be determined accurately without a calorimeter. The same applies to all other analysis and testing. While the writer cannot adduce any specific instances, it is undoubtedly true that considerable money can be saved by the proper application of routine analysis; and aside from this, the moral influence of obtaining quality on purchases is always present. The chemist continues to be of value in investigating matters of secondary importance to the actual manufacture of gas. The recovery of waste material is an item worthy of consideration. The use of basic brick in generator linings, the utilization of powdered coal under boilers, new methods of purification—all these are now in the thoughts of the chemist.

By co-ordinating with other departments, the chemist is able to become of further usefulness. The purchasing department is benefited considerably when many of the items which it buys are standardized and specifications drawn-up for them. Paints, paint

and meter oils, solder, pipe-covering, brass fittings, detergents, &c., are only some of the items. The testing of the efficiency of industrial appliances and gas-tubing for the commercial department are illustrations of work which the chemist has undertaken with success. Co-ordination with the holder department offers another example. Holders have at times to be emptied for repairs; and before they can be filled again, they must be freed from air. The chemist, with the aid of a gas analysis explosion burette, can determine when it is safe to replace the manhole cover and fill the holder with gas.

Returning to the topic of research by the chemist, it must be stated that while much valuable work has already been contributed, especially on carburetted water gas, the field is still fertile. The effect of such variables as temperature, pressure, time, contact, and concentration have been studied by several investigators, and attempts have been made at commercial application.

A comparatively new, but most important, phenomenon is drawing the attention of the chemist both inside and outside the field of gas manufacture. This phenomenon is called "catalysis"—the term used to designate those chemical changes the progress of which is modified by the presence of some foreign substance. The agent which induces or accelerates the effect is called the "catalyst." Dr. Ostwald is authority for the statement that there is probably no reaction which cannot be influenced catalytically, and no substance, whether elementary or compound, which cannot be used as a catalyst. Actually, catalysis is now being used as a basis of many industries, some of which are very large; and its application to the manufacture of gas offers possibilities.

An interesting application of catalysis to coal gas manufacture is given in a French patent taken out by Vignon. In this patent, he attempts to devise a scheme for the complete gasification of the coal. The process consists in mixing lime with coal, and distilling the whole at a temperature of 900° to 950° C., whereby a yield of 12,000 c.ft. of gas per ton of coal is obtained. Steam is then passed over the residual coke and lime, at a temperature between 900° and 1000° C., which increases the yield of gas to 72,000 c.ft. per ton of coal. The patent states that the calorific value of the gas is only slightly inferior to coal gas, but the yield is several times greater than that produced by ordinary distillation, and practically the whole of the nitrogen in the coal is converted into ammonia.

The extraction of carbon disulphide from gas is being carried out in England with the aid of catalysis, using nickel as the catalyst. There is no doubt that in the very near future catalysis may be successfully applied by the chemist to the gas industry.

The value and usefulness of the chemist depend upon the way in which the technical staff of a company direct his activities. If properly used, the chemical department can be made to pay for itself many times over every year. But far more important than merely saving money is the fact that chemistry is always leading the way to new and useful developments in gas manufacture.

THE NEED AND VALUE OF THE CHEMIST TO THE SMALL GAS PLANT.

Speaking of the subject as affecting the smaller works Mr. H. Vittinghoff, of Boston, remarked that the preceding paper had shown very clearly how necessary a member of the organization of the large gas plant is the chemist. This should, of course, be a self-evident fact when it is considered that the manufacture of gas is a chemical industry rather than a mere technical process depending only upon the mechanical operation of certain machinery, the performance of which can always be prognosticated with accuracy by its designer. While great engineering skill is required in the design of electrical generating apparatus, for instance, and in connection with the arrangement of the various appliances in the power-house, the operation of such an establishment, though necessitating the exercise of considerable judgment, great vigilance, and a marked amount of mechanical ability—especially in connection with maintenance work—does not require that the operating staff necessarily includes a man of thorough technical or scientific training.

Any industry established for a long enough period of time is bound to feel its true requirements, its salient needs. The electrical industry recognized that its interests were best served by expending the greatest efforts on the scientific development of the art of designing the generating and auxiliary apparatus. It is not an unfair criticism of the gas engineering profession to state that it has never produced men whose scientific accomplishments equal those who stand on the pinnacle of the engineering profession specializing in the development of electrical apparatus. The cause of this is twofold. Originally the fault was ours. For some half-a-century the gas industry was dominated by men whose chief virtue was their faithful adherence to the methods and ideas of their predecessors. This, fortunately, is a phase which we are rapidly outgrowing, if we have not already entirely escaped its baneful effects. The second and more important cause is to be found in an entirely different direction. The human race for the last two thousand years or so has not shown itself to be markedly altruistic. With the exception of a diminutive, if not negligible, minority, we are inclined to put forth our greatest effort in ventures which we believe will result in the greatest direct gain.

This general tendency is illustrated by the direction which progress has taken in the development of gas engineering. Relative to the advance in methods of operation, the scientific design of apparatus has lagged behind. The electrical engineer found his reward immediately he had produced highly efficient machinery. With but little change in design, standardized power-house equipment will work successfully, providing ordinary care and judgment are used in operation, whether wood is to be burned under the boilers in the North-West, anthracite in Pennsylvania, high volatile coal in Alabama, oil in Texas, or "begasse" in the West Indies. The gas engineer is not so fortunate. Owing to the infinite variety of raw materials which local conditions of an economic nature force him to use, the proper scientific design of manufacturing apparatus is bound to be second to the necessity of exercising the greatest care in the choice and application of the most economical operating methods in working-up such available raw materials.

It is not intended to convey the idea that for our work crude apparatus is good enough, or even acceptable; nor that a limit has been reached beyond which it is useless to push the application of science to the design of apparatus. On the contrary, not nearly enough has been done along this line, in spite of the excellent work of our designers—especially in the last ten years. But it should be emphasized that our designers are, from the very nature of the problems which confront us, not in the position to offer us the aid which it was in the power of the electrical engineer to yield to the central station operator. In our line of work the end is not reached, or even approached, when we have installed suitable apparatus, even if of the best design for the conditions prevailing. It still remains to devise proper manufacturing methods in order to attain the most economical results.

Such methods of manufacture can only be brought to the highest degree of perfection if their working-out has the benefit of the services of a man with chemical training. In fact, the responsibility for the choice of the methods of manufacture to be adopted should be placed entirely in the hands of a chemist—or, better still, a chemical engineer. Such a man is of necessity a specialist, and usually has the limitation of a specialist in any branch of learning—an inclination to subordinate general aims to the requirements of an exact application of scientific principles. At this point, therefore, it should be brought out that we must differentiate between operation and manufacture. The executive head of the plant responsible to the general manager should be the operator who has to supply the demand for gas, arrange for the necessary raw materials, meet the labour problems, supervise the maintenance work, &c.; and he should have on his staff a manufacturing specialist, a chemist, who should control the consumption of the raw materials and devise means for obtaining the best results from the apparatus and materials at hand.

This is undoubtedly the best organization for the large plant. For a small plant—*i.e.*, one producing less than a million c.ft. per day—the problem is immediately complicated by the expense of maintaining and paying for a dual organization. In such a case, the management must decide whether it is wiser to dispense with the services of a superintendent perfectly trained along mechanical lines, and take a risk of neglecting the maintenance work or running into other operating difficulties, or dispense with a chemist and carry on the manufacturing work in the usual rule-of-thumb way which, it is regrettable to say, is still so prevalent. The obvious solution of engaging for the duties of a superintendent the services of a man trained both as an operator and a chemist is much easier of statement than of attainment.

Fortunately, the very fact that the plant is so small that it is not in a position to maintain both an operating superintendent and a manufacturing chemist, carries with it, in a good many instances, its own compensation. The commercial problems, matters of policy, and questions of public relations are often not so weighty, nor so arduous, but that the general manager can give a good portion of his time to the supervision of the operating activities, relieving the superintendent of a great many of the duties for the performance of which in the larger plants he is responsible, and permitting him to devote his energies to following in detail the various processes of manufacture and bye-product recovery.

Under such conditions it is entirely possible for even a small gas plant to engage the services of a technical graduate who, though he may not be a full-fledged chemist, has received in his course of study such a sound fundamental knowledge of chemistry, both general and analytical, as to enable him to apply this knowledge to the supervision of chemical operations carried on under his direction. He should be able (and have the necessary time) to make the analyses which will enable him to demonstrate to his manager which raw materials available in the local market should prove most economical, and result in the lowest operating costs. It is even more important that he devote considerable attention to the functioning of the manufacturing apparatus itself. In a water-gas plant, for instance, he should not only give his attention to the daily test for carbon dioxide in the finished gas, but considerable time should be devoted to the investigation of the intermediate products—such as blue gas, producer gas, and waste gas; and the supply of steam and air during the run and blow should be regulated upon a rational basis indicated by the information yielded by the chemical investigations. Aside from the routine investigations of the producer and flue gases in a coal-gas plant, the distribution of the ammonia, for instance, in the gas as it passes through the various pieces of apparatus should, of course, be observed, in order to discover how they function; while tar determinations yield equally useful and important information. Investigations of a general nature—such as the effect of introducing more or less steam or stack gas under the producer grates, higher or lower vacuum in the retorts, the effect on purifying

efficiency of backward or forward rotation of the boxes—are innumerable, and all yield useful information tending, if intelligently applied, towards lower manufacturing costs. They are therefore to be considered as part of the superintendent's chemical work.

It may be objected that this employee's time can be more usefully applied along more general lines. It is perfectly true that the observations it is necessary to make so as to obtain the information outlined heretofore, are not of a nature to require the services of a highly-trained technical observer—such, for instance, as would be required for the work of the research chemist. In fact, most of the determinations can be made in "cook-book" fashion, according to a set of typed instruction; and they can be performed by an intelligent high-school graduate. What cannot, however, be accomplished in such fashion is the interpretation of the data gathered. This requires the best technical knowledge available at the plant. Assuming that the superintendent, as advocated, is a technical graduate, his duties should be so apportioned that he has ample time to devote himself to this part of the manufacturing work which, under the conditions outlined, he should consider his most important duty.

In a country as rich in natural resources as the United States, it is not astonishing that the industries should have been slow in accepting the benefits which exact science, when applied to manufacturing processes, can bestow. We can note with gratification that the gas industry may claim to be among the first of the great branches of industrial undertakings to enrol the services of science in its endeavour to derive the greatest benefits from the smallest demand on the gifts with which Nature has endowed us. With us, the chemist has come into his own.

Gas-Piping Installations in Montreal.

There are bye-laws governing gas-pipes and the installation of them in the City of Montreal. The rules to be followed with regard to gas-piping inside dwellings which are three storeys, or less than three storeys, high, state that the main horizontal pipe and the riser shall be not less than 1¼ in. diameter throughout their whole length. The meter-pipe shall not be less than 1½ in. diameter; while every pipe or branch for ceiling-lights shall be not less than ½ in. diameter, and not more than 20 ft. in length. A pipe or branch for wall-lights must not be under ⅜ in. diameter, and not more than 20 ft. long, though it may be used for lighting two rooms. It is forbidden to instal a pipe on an exterior wall, staircase, vestibule, or any other portion of a building which may be exposed to frost. The riser shall be connected with the main horizontal pipe by means of a tee, at the lower outlet of which a nipple and cap shall be placed. The main horizontal pipe shall have a slope towards the street of not less than 1 in. to every 20 ft.; and the distributing pipe for lighting purposes shall have throughout its whole length a slope of 1 in. to every 40 ft. All horizontal or vertical piping shall be fastened by means of a holdfast at every 8 ft., and at any other point which may be considered necessary by the Plumbing Inspector. Piping of ¼ in. diameter is prohibited in a gas-piping system; and pipe of only ⅜ in. diameter shall be used exclusively for wall-lights, and shall in no case exceed 20 ft. in length. All connections from the bottom of gas-pipe lines are prohibited. The floor in the basement or in the first storey shall be provided with an opening large enough to give easy access to the street service. The main horizontal pipe shall be connected with the street service from the centre of the tee on the end of the street service. It is forbidden to remove the tee from the end of the street service. By "main horizontal pipe" is meant the main pipe in the basement which is to be connected with the street service.

Periscope for Reading High Meters.—Among the "Wrinkles" given in "Gas Industry," Mr. G. P. Schatzel, of Findlay (Ohio), suggests that, as a means of getting over the difficulty of reading gas-meters fixed too high for them to be clearly seen, gas officials might be provided with an ordinary periscope. This should have an electric flashlight attached to the top, so as to throw a light on the meter-dial.

Metropolitan Gas Referees' Notification.—The Metropolitan Gas Referees (Prof. C. V. Boys, Mr. W. J. A. Butterfield, and Dr. J. S. Haldane) have no alteration to make in their notification for 1918, or in their supplementary notification dated August, 1918 [see "JOURNAL," Aug. 13, 1918, p. 295], beyond the corrections stated in their notice dated Jan. 1, 1919 [see "JOURNAL," Dec. 31, 1918, p. 712]. For the present, therefore, the above notifications will continue to be in force.

Swiss Society of the Gas and Water Industry.—We have received the report of the forty-sixth annual meeting of the Société Suisse de l'Industrie du Gaz et des Eaux, held at Lucerne, in August last, under the presidency of M. Burkhard, of Lucerne. There were no technical communications, with the exception of Committees' reports on the "Official Testing and Stamping of Water-Meters" (presented by Dr. König, of Berne), on "Stray Currents in Electric Distribution" (presented by Herr Peter, of Zurich), and on "Heating and Lighting Standards" (presented by Herr F. Escher, of Zurich). The latter contains only a brief statement of the obstacles in the way of further progress being made in the examination of the question. M. Chastellain, of Lausanne, was elected President for the current session.

CORRESPONDENCE.

[We are not responsible for opinions expressed by Correspondents.]

Railway Rates for Sulphate.

SIR,—We notice in your last issue a report stating that the railway rates on sulphate of ammonia are subject to the 50 p.ct. increase. Kindly note that this is not the case, as sulphate of ammonia has always been regarded as "packed manure;" and we are informed by the Board of Agriculture that, so long as consignments are made as "packed manure," no increase in the rates hitherto applying will be made.

We would ask you to publish a correction in a prominent place in your next issue, as it is most important that no consignmenst of sulphate of ammonia should be paid for on the basis of the increased rates.

SULPHATE OF AMMONIA ASSOCIATION,
F. C. O. SPEYER, Manager.

30, *Grosvenor Gardens, S.W.*,
Jan. 9, 1920.

Where is the National Association of Technical Gas Officials?

SIR,—The need for this Association (of which much has been heard from time to time, but nothing seems to develop) was never more exemplified than by the advertisement of the Hyde Gas Company in your current issue for an engineer and manager.

This gentleman, who is expected to devote his whole time to the office, and to be an up-to-date, thoroughly trained man, is asked to accept the miserable remuneration of £350 per annum for a works making 219 million c.ft. of gas per annum. Even urban district councils, who have never been supposed to be very generous in these matters, have risen to the occasion better than this Company, as shown by one in the advertisement below [Hindley], where they are offering £350 per annum—the same salary—for their gas-works, where the make is only 90 million c.ft. per annum.

It is, therefore, but generous to suppose that some mistake has been made by the Hyde Gas Company, and that they really propose to offer £700 per annum for this appointment, which is little enough in these days of depreciated currency. My general foreman is paid more than the sum they are offering for a gentleman to take full charge; and even shift-captains, without anything like the same responsibilities, are now receiving £5 a week, and are likely to receive more.

With all due deference to the Hyde Gas Company, I can only describe their advertisement as a scandal.

Other peculiar methods of filling appointments also call for very serious consideration by the technical men in the industry. Only recently the Blackburn Corporation advertised for an Engineer and Manager, and took the opportunity of the Christmas Holidays to appoint a gentleman from North of the Border for the third time in succession, and are, therefore, closely following in the steps of Nelson, who have taken this course on four occasions. I have nothing to say against gentlemen from across the Border, of whom I know several very able men; but among the applications for the Blackburn appointment there were several English engineers who are also very able men, who did not receive any consideration at all. In cases of this description, it seems desirable that, as these boroughs have practically labelled themselves "No English need apply," in all future vacancies in these quarters it would only be dignified on the part of the English engineering fraternity to ostracize the boroughs.

In order to prevent any misunderstanding, I should like to add that there is no question of "sour grapes" in this expression of opinion, as I occupy the chief position in a works larger than any of those under consideration, where the remuneration is much superior. My remarks are solely in the interests of the profession.

JUTLAND.

Jan. 8, 1920.

Financial Adjustment for Gas Companies.

SIR,—In view of the proposed Government Bill, it would indeed be impolitic to raise a controversy on the mode, &c., of bringing gas companies into line with present-day value of money; but it does occur to one that there ought to be little doubt as to the extent, and certainly no doubt of the urgent necessity. So many companies are "marking time" in their plans because of the difficulty of raising new money—in some cases, to pay off banker's loans, and otherwise to provide capital for future extensions. This difficulty, unless solved at an early date, will mean inconvenience to the public.

One hopes that very soon something definite will be revealed by the Government as to their intentions, and so allay this great uncertainty. New money can only be raised on current market values; but fresh gas investors will certainly be influenced by the extent justice is meted out to the existing stockholders. Personally, I am an out-and-out admirer of the sliding-scale; the crux of the difficulty to-day being that the pre-war 20s. has only a purchasing value of about one-third. This being so, obviously old standard prices as a pivot for dividends must be substantially out of gear, and need adjustment. The machinery for carrying out this re-arrangement cannot be too simple; and I sincerely hope that there will be no attempts to create all sorts of periodical revisions.

R. W. EDWARDS.

Aldershot Gas, Water, and District Lighting Company,
Aldershot, Jan. 9, 1920.

Ammoniacal Liquor and Potato Disease.

SIR,—In your issue of the 30th ult., "Charleymange" states that he is persuaded potato disease can be eradicated by the use of crude ammoniacal liquor, thus abolishing the disinfecting by spraying the haulm.

May we ask him to make it quite clear as to what he means by

potato disease? During the past two years, we have been associated with some experiments dealing with two of the most common potato diseases—namely, "Black Scab" (Sychytrium endobioticum P.) and "Common Blight" (Phytophthora infestans). But in each of these cases the disease was more manifest after the plants had been treated with crude ammoniacal liquor.

SULPHATE OF AMMONIA ASSOCIATION,
A. O. BLACKHURST,
Assistant Home Manager.

Gas Offices, Fishergate, Preston, Jan. 5, 1920.

Dilution—Water Gas and Steaming.

SIR,—Your editorial of the 30th ult. (under the above heading) and other recent ones dealing with the same subject, bring into prominence the present-day necessity of producing the maximum quantity of B.Th.U. in gaseous form that coals are capable of yielding, and at the lowest possible cost. But we think that the paragraph in the issue of Dec. 9, p. 536, col. 2—to the effect that the 15 p.ct. limitation of inerts "rules-out of possible adoption for town supply carbonization schemes which aim at the complete gasification of the coal"—requires some qualification.

The Tully plant, which can be used for practically the complete gasification of the coal (the pan breeze and small quantities of tar and ammonia being the only bye-products) can effect this without exceeding 12 p.ct. of inerts in the gas; and with a slight sacrifice of the make per ton, even this figure can be reduced. Gas undertakings could be named using this type of plant that are intending to make all their town gas supply by the process, as being more economical than other methods. "Low inerts" are claimed as one of the special advantages of this particular type of plant.

HEWITT CONSTRUCTION SYNDICATE, LTD.

Jan. 7, 1920.

[The qualification can be readily given. The quoted sentence would perhaps have been clearer if the word "certain" had appeared before "carbonization." This would have better indicated that we had in mind schemes for complete gasification in which a much higher percentage of inerts is produced; while, of course, there are others (the Tully among them) the gas from which contains a low percentage of inerts.—ED. G. J.]

REGISTER OF PATENTS.

Strengthening and Increasing the Luminosity of Incandescent Gas-Mantles.—No. 135,797.

POPE, H., of Tibshelf, near Alfreton.

No. 15,939; June 25, 1919.

This inventor suggests improving gas-mantles by a mixture of three substances—yellow resin, one part; common washing soda, four parts: common chalk, ten parts. These substances (ground to a fine powder), when applied evenly over mantles, and then burnt for ten minutes, produce (it is said) a better light and a stronger mantle. Also, the powder, when reduced to a liquid by methylated spirits, may be applied to mantles, to produce the same result.

Gas-Producing Plant.—No. 135,959.

CLIMIE, W., of Ayr, and LEES, W., of Glasgow.

No. 20,392; Dec. 9, 1918.

This "complete gas producing installation," besides producing gas from the usual fuels, at the same time generates steam at such a pressure that it will actuate a steam-engine of sufficient power to operate all the moving parts and members of the installation, and also provide a surplus of high-pressure steam for other purposes. The type of gas-producer and steam-generator used is that described in patents No. 6132 of 1897, No. 13,026 of 1909, and No. 25,736 of 1911, in which the producer is surrounded by a steam-generator.

The complete installation consists in an arrangement whereby a producer and generator similar to that described in the earlier patents in conjunction with a gas-cooler (preferably similar to that described in patent No. 4264 of 1915) and a gas-purifier (preferably similar to that described in patents No. 11,136 of 1914 and No. 1045 of 1915).

In combination with the producer and generator, the cooler, and the purifier, there is arranged a steam-engine supplied from the producer generator with high-pressure steam and adapted to actuate the devices for raising the fuel to the top of the producer, the blowing apparatus for delivering air at a suitable pressure to the centrally located perforated cone at the lower part of the producer, the producer fuel rake or its equivalent, a producer chain grate (preferably similar to that described in patent No. 19,954 of 1914), and the pump for supplying pressure water to the turbine at the top of the purifier. The gas is formed in the producer, is led to the cooler, and then to the purifier, from which it is conducted to the place where it is to be utilized. The steam is generated in the generator, conducted to the engine, and the exhaust steam is conducted back to the producer and directed (along with the pressure air from the blower) into the centrally located cone at the lower part of the producer. The steam-pipe from the generator to the engine is provided with a bye-pass and valve, so that the surplus steam generated over that required for the engine can be conducted to other parts of the works and utilized as desired.

Production of Gas.—No. 136,186.

WELLINGTON, S. N., of London Wall, E.C.

No. 10,972; July 30, 1917.

This invention relates to the production and utilization of gas of high calorific value produced in the destructive distillation of coal, &c., at comparatively low temperatures. Such gas—owing to its richness and to the rapidity of its combustion—is not adapted for power purposes and for general industrial employment; and it is the object of the invention to utilize the gas for mixing with gas of a lower calorific value (approximating standard gas) for steam generation and for general industrial use. This is attained by mixing with the low-temperature gas—*i.e.*, from about 400° to 620° C., and having a calorific value of about 700 to 750 B.Th.U.—producer gas, which has about an approximate calorific value of 125 to 150 B.Th.U. With a view to secure the calorific value of a standard power gas from the mixture—that is, a gas of constant value of 300 B.Th.U.—the patentee proposes to mix the respective gases in the approximate proportion of one volume of low-temperature coal gas and two-and-a-half volumes of producer gas.

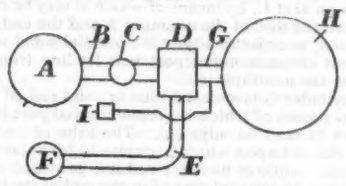
To attain this end, the apparatus proposed is that shown in the abstract below of patent specification, No. 136,200. It will, however, be understood that a simple mixing-chamber alone may be provided, and that the admission of the respective gases thereto may be controlled by suitable governors or valves to produce a mixture in the approximate proportions stated.

Mixing Gaseous Fuels.—No. 136,200.

WELLINGTON, S. N., of London Wall, E.C.

No. 13,737; July 30, 1917.

This invention is applicable to the mixing of a rich gas of high calorific value with producer gas, as described in patent No. 136,186, with a view to maintain the volumetric ratio or the calorific value of the mixed gases substantially constant, by employing a calorimeter adapted automatically to vary the amount of coal gas admitted for admixture with producer gas.



Diagrammatic Sketch of the Wellington Arrangement.

The apparatus diagrammatically illustrated shows a gasholder A for the low-temperature gas. The outlet pipe B from the holder is connected to a water-loaded governor C, and then to a chamber D, to which is also connected an inlet gas-main E from the gas-producer F. Within the mixing-chamber any means may be provided to mix the gases as they enter the chamber. From the chamber D a pipe connection G is made with a second holder H for storing the mixed gas. The valve of the governor C allows a supply of mixed gas, as it issues from the chamber D, to pass to a controlling calorimeter I of known kind—for example, it may consist of two tanks containing liquid, within which floats are immersed suspended from the ends of a beam. Beneath one tank a supply of the mixed gas is drawn off and burned. If the calorific value of the gas is substantially different from the standard, the float within the liquid in the heated tank will rise or fall owing to the variation of temperature of the liquid. The variation in the level of the float effects the movement of the beam, which may be connected to, or may electrically control, a water-cock, so that water may be admitted to, or released from, the water-loaded governor controlling the admission of the low-temperature gas into the mixing-chamber.

The beam may be provided with a contact arm, to operate between two contacts corresponding, for example, to a calorific value of 310 B.Th.U. on one side and 290 B.Th.U. upon the other; so that when the contact arm carried by the beam approaches one or other of these contracts, the circuit of a solenoid is completed, whereby the water-cock is opened or closed, and liquid is admitted to, or withdrawn from, the water-loaded governor. Thus the volume of low-temperature gas admitted to the mixing-chamber may be varied to restore the calorific value of the mixed gas to the standard.

Gaseous Fuel Burners.—No. 136,296.

IONIDES, A. C., JUN., of Porchester Terrace, W.

No. 21,314; Dec. 19, 1918.

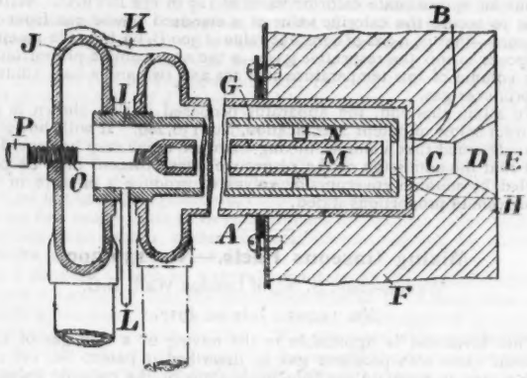
This invention consists in a gaseous fuel combustion appliance for forming a mixture of gas and air closely adjacent to the combustion zone. The fluids enter a central space through adjacent parallel circumferential port belts, each of adjustable width; and the mixture passes immediately by a diverging orifice into a combustion chamber.

A more or less diagrammatic longitudinal section is given [p. 84] through a burner and mixing appliance fitted to a combustion chamber in accordance with the invention.

The chamber A is formed entirely as a metal casing where temperatures will permit (in small furnaces), or partly of metal and partly of refractory material, in such a manner that a co-axial orifice B in a flat disc forming the end of the chamber leads, by way of a slightly converging or parallel portion C of the central space, to a flared or coned mouthpiece D communicating with the combustion chamber E. The chamber A is extended for any desired length exterior to the outer face of the wall F of the furnace, and at its end is provided with an enlargement in the shape of a shallow bulb having a boss with an internal screw-thread and a branch by which one of the gaseous constituents of the mixture—say, the gas—which is the lighter of the two, is supplied to the appliance.

Positioned co-axially within the chamber A is a hollow cylinder G having a flat disc end, in which is an aperture H co-axial with, and

preferably slightly smaller than, the orifice B in the chamber A—the discs providing between them a parallel sided disc-like passage forming a circumferential port belt opening into the central space. The cylinder G at its outer end has a screw-threaded portion I engaging with threads formed in the boss, and also engaging internal threads in the boss of a second shallow bulb J, positioned at a convenient distance behind the first-named bulb by connecting pieces K. The bulb J is also provided



Ionides' Gaseous Fuel Burner.

with a branch for supplying the heavier gaseous constituents of the mixture—air—to the apparatus. The portion I is provided between the two bulbs with an arm L, by means of which it may be rotated and the distance between the disc of the chamber A and the end of the hollow cylinder G varied, in order to adjust the parallel sided radial disc-like passage-way and circumferential port belt leading from the annular gas-passage into the mouthpiece C.

Within the cylinder G is a closed tube or solid rod M having a flat circular end, by means of which a circumferential port-belt surrounding the aperture H may be adjusted. The tube or rod is supported adjacent to its flat end upon wings or guides N for retaining it co-axial with the aperture; while at its other end it is provided with a screwed portion O engaging an internal thread in the end of the bulb J. At the extreme end of the rod M is a squared portion P for receiving a key, by means of which the port belt for leading the heavier constituent to the aperture H may be adjusted, and which provision, in combination with the arm L, permits the adjustment of both port belts without disconnecting the burner or even interrupting combustion.

In burners of large dimensions (or where very high temperatures are likely to be experienced), the portion of the chamber A adjacent to the burner mouthpiece may be formed in the refractory material of the wall itself, and the remainder of the chamber may be formed of metal suitably connected. Alternatively, a cylindrical refractory portion may be separately attached to the metal portion of the chamber shell prior to the attachment of the complete element to the furnace wall. The inner part of the cyclinder G and the end of the rod M may also be formed of refractory material connected to metal portions provided in the cooler parts of the apparatus.

Means for obtaining a sample of the mixture are provided by replacing the rod M with a hollow member having a removable plug at its inner end; or a small passage-way may be provided for this purpose from the flared combustion orifice to the exterior of the furnace wall.

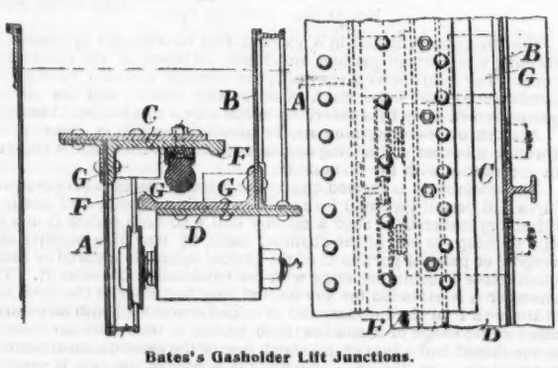
Gasholders.—No. 136,332.

BATES, J, of Leicester.

No. 868; Jan. 13, 1919.

According to this invention, the joint between the sections of a telescopic gasholder is made by an annular lute of rubber attached to a horizontal flange on one section and adapted to make contact with, and be compressed by, an opposing horizontal flange on the adjacent section; while rest-blocks arranged on, and secured to, one or both flanges serve as abutments for a preferably beaded part of the opposite flange, so as to limit the compression of the lute and take the weight of the lifted section.

The illustration shows a sectional elevation and a part sectional plan of the invention as applied to a two-lift holder.



Bates's Gasholder Lift Junctions.

The larger of two sections A and B of the holder is provided at the top with an inwardly turned horizontal flange C; while the smaller section has at its lower end an outwardly turned horizontal flange D, extending under the flange A of the larger section. These flanges are annular in form, and upon one of them (preferably the flange C) is mounted a ring E of rubber. Preferably, the ring is of circular cross section, and has on it beads formed to fit into a channel or rim secured to the flange by bolts. The ring is so arranged between the flanges C D that when the lifts are extended as the holder fills, the lower flange will engage the ring and compress it to a certain extent, so as to form a gas-tight joint between the two sections.

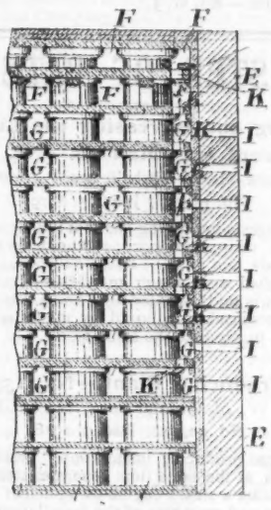
Each flange has a bead F formed integrally with it, and upon the opposing faces of the flanges steel blocks G are arranged at intervals and secured by bolts or rivets. When, by reason of the extension of the lifts, the flanges are brought close together so that the joint ring E is compressed, the bead on one flange comes into contact with the block on the opposing flange, and serves as an abutment to limit the compression of the lute and provide a solid lift to take the weight of the lower section, and thereby obviate undue pressure on the lute.

Vertical Retort-Settings.—No. 136,398.

CUMMINS, F., of Manchester.

No. 5002; Feb. 28, 1919.

This invention relates to the Glover-West type of vertical retort-settings, wherein a plurality of superposed combustion chambers are provided at each side of a row of vertical retorts, and each combustion chamber independently communicates at one end with the producer-gas shaft. Hitherto in this type of settings it has been customary, the patentee remarks, for the purpose of leading the waste gases to the circulating chambers, to provide flues in the rear wall of the setting, and to connect all the rear ends of the combustion chambers and the circulating chambers to the waste-gas flues by flues controlled by dampers. But according to this invention, holes are formed in the floors of all the combustion chambers and circulating chambers—all at the rear ends of the chambers—and the waste gases from each combustion chamber are arranged to travel upwardly through the rear ends of the chambers and above them into the circulating chambers.



Cummins' Vertical Retort Setting.

In the illustration, the waste-gas flues at the back of the retorts are dispensed with, and a plain wall E, of suitable thickness, is built in place thereof. It is lined with silicate brick, and encloses the back ends of the circulating chambers F and combustion chambers G (the former situated above the latter). In the wall the usual "sight holes" I are formed. Adjacent to each side of the back retorts is a hole K through the floor of each combustion and circulating chamber, through which the waste gases can rise.

Gas-Furnaces.—No. 136,356.

SOUTH METROPOLITAN GAS COMPANY and CHANDLER, D., of Old Kent Road, S.E.

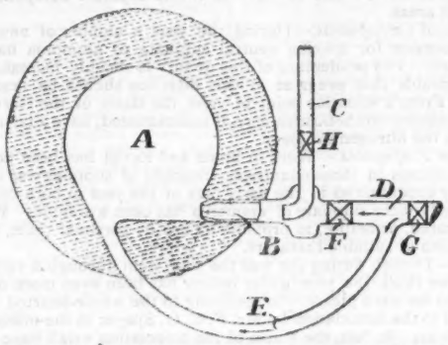
No. 2097; Jan. 28, 1919.

The present invention relates to gas-furnaces, particularly to that type in which the combustible mixture is tangentially supplied to the furnace—as, for instance, "glory holes," "shell-nose heating furnaces," and the like.

In these furnaces the combustible mixture of gas and air is admitted to the interior of the combustion chamber through the burner, and is ignited at the point of the latter.

The patentees arrange that a portion of the air required for combustion is led tangentially into the furnace at an angle to the flame, and at or near the point at which the flame would otherwise impinge, in such a manner that the flame is deflected, and so the intense localization of the heat is prevented. The diversion of a portion of the air required for combustion to another part of a furnace is, it is noted, not in itself novel; but in a furnace constructed according to the present

invention, it is found greatly to silence the burner as well as to stop the intense localization of the heat which is damaging to the structure.



Chandler's (South Metropolitan Gas Company) Gas-Furnace.

A is the combustion chamber and B the burner supplied with gas by the pipe C and with air by the pipe D. E is a branch pipe from the air-pipe by which a portion of the air is diverted from the burner and introduced into the furnace at another point in the manner above indicated. F and G are valves in the air-pipe in front of and behind the branch pipe E, and H is a valve in the pipe C.

APPLICATIONS FOR PATENTS.

[Extracted from the "Official List" for Dec. 31.]

Nos. 32,036—32,892.

BARKER, S.—"Tar-distilling plant." No. 32,059.
BATEMAN, H. L.—"Continuous carbonization of coal, &c., by inclined retorts for the manufacture of combustible gases and coal bye-products." No. 32,438.
BERG, M. J.—"Processes for the distillation and refining of volatile substances and carbonization and coking thereof." No. 32,096.
BREEDEN, F., and BREEDEN & Co., J.—"Valves for heat radiators, &c." Nos. 32,306, 32,307.
BURDON, M. M. & W. M., and BURDONS, LTD.—"Oil-gas burners." No. 32,480.
COLLINGE, J. S. H.—"Movable stand for gas apparatus." No. 32,258.
DALLMEYER, S. S.—"Taps, valves, &c." No. 32,192.
DAVIS, R. H.—"Apparatus for analyzing gases." No. 32,697.
DUPLEXALITE CORPORATION.—"Illuminating appliances." No. 32,354.
ELGIN GAS MOTOR COMPANY,—"Gas-engine starter." No. 32,821.
EVERS, G. V.—"Atmospheric gas-heating burners." No. 32,228.
FULLER, G. C.—"Gas-lighting pistols." No. 32,512.
GABELL, J.—"Gas-fires." No. 32,252.
GARDNER, W. T.—"Vertical retorts for carbonizing coal." No. 32,220.
GLOVER, A. W., and GLOVER & Co., G.—"Gas-meter indicators." No. 32,104.
GREEN, E. J.—"Methods of revivifying material in gas-purifiers." No. 32,073.
HOWELL, M. M. M.—"Cardboard, &c., boxes for inverted gas mantles." No. 32,123.
JEFFERYS, F.—"Gas-stoves, gas-rings, &c." No. 32,225.
KOHORN, H.—"Gas-stoves." No. 32,101.
LEEK, A. E.—See Green. No. 32,073.
LOVELACE, B. F.—"Separating gases." No. 32,408.
M'KEAN, J. G.—"Liquid-fuel furnaces." No. 32,461.
MARKS, E. C. R.—See Duplexalite. No. 32,354.
MASON, A. I.—"Forming gas, water, and steam joints, &c." No. 32,447.
MILLER, E. B.—See Lovelace. No. 32,408.
PASLEY, J. F. W.—"Gas-producers." No. 32,602.
PATRICK, W. A.—See Lovelace. No. 32,408.
REEVE, H. C.—See Dallmeyer. No. 32,192.
ROSLING, C.—See Davis. No. 32,697.
RÜTGERSWERKE AKT.-GES.—"Process for production of soot-carbon, retort graphite, &c., from natural gas." No. 32,380.
SMITH, D. J.—"Gas-producers." No. 32,071.
SPURIN, F. R.—See Jefferys. No. 32,225.
TULLOCH, T. G.—See Smith. No. 32,071.
WEAVER, G. T.—See Mason. No. 32,447.
WELLMAN-SEAVER MORGAN COMPANY.—"Feeding-mechanism for gas-producers." No. 32,580.
WOODALL, DUCKHAM, & JONES.—"Vertical retorts for carbonizing coal." No. 32,220.

[Extracted from the "Official List" for Jan. 7.]

Nos. 1-267.

COMMIN, F. J.—"Treating pitch." No. 79.
TRÄGER, J. H.—"Gas heating-stoves." No. 156.
WENTWORTH, E. G.—"Automatic light-controller." No. 36.

Messrs. A. & W. Richards, of No. 37, Walbrook, E.C., have been instructed by the Directors to issue at par £6500 of 6½ p.ct. redeemable mortgages for the Herne Bay Gas and Electricity Company, Ltd. The mortgages are to be paid for on or before the 31st inst.

MISCELLANEOUS NEWS.

THE NEW "INSTRUCTIONS."

The Commercial Gas Company Announce the First Quarter's Domestic Gas "Allowance."

In the newspapers published in the East-end of London last Saturday, the following notice (signed by Mr. F. J. Bradfield, the Secretary of the Commercial Gas Company) appeared:

The Directors of the Commercial Gas Company have pleasure in announcing that the allowance in respect of gas used for domestic or household purposes, calculated in accordance with the instructions issued by the Controller of Coal Mines, will be 7½d. per 1000 c.ft. for the first quarter of 1920. The allowance will be shown on the accounts.

In the case of prepayment consumers, the present adjustment of 16 c.ft. for each penny allows of a return to the consumer of 2½d. per 1000 c.ft. To this amount the allowance referred to above will be added; and on and after the 15th inst., the collectors will return the sum of 10d. per 1000 c.ft.

THE GOVERNOR OF THE GAS LIGHT AND COKE COMPANY ON CO-PARTNERSHIP.

The following "New Year's Greeting" to the employees by the Governor (Mr. D. Milne Watson) appears in the January issue of the Gas Light and Coke Company's "Co-Partners' Magazine."

In sending you my hearty good wishes for a happy and prosperous new year, I should like to take the opportunity to emphasize the necessity of everyone in the Company's employment, from the highest to the lowest, trying to realize the meaning of co-partnership. We, in this Company, have long believed in close inter-relationship between the three partners in our business—the employers, the employed, and the consumers. In these times, however, this view is apt to be lost sight of; and it is very necessary for us to bear in mind that not one of the three can succeed unless all three prosper. The employers and employed must remember that they are the servants of the public, and that if either the one or the other of them (employers or employed) forget their duty in this respect, and seek to obtain undue advantage for their own particular section, they will injure the well-being of the Company. In these times it is essential to remember this.

With regard to the future, there never was an occasion when the general usefulness of gas was better realized than to-day by the nation; and our Company will succeed—always provided that we bear in mind the old Cornish saying, "One for all, and all for one."

We are very glad to welcome back those who left us to take part in the great war, and trust that the sense of hardships endured and victory won will enable them to face the future with renewed confidence.

SOUTH SUBURBAN CO-PARTNERSHIP MESSAGE.

The following Directors' message (signed by the Chairman, Mr. Charles Hunt) forms part of the South Sururban Gas Company's Co-Partnership Almanack for 1920.

To the very earnest wish that all co-partners will enjoy every happiness throughout the new year, the Directors desire to add their hearty congratulations upon the notable step in social progress which has signallized the year just ended. They are more than gratified by the way in which the numerous difficulties attending the formation of a really comprehensive and all-embracing scheme of superannuation were overcome by the hearty and painstaking co-operation of all concerned. The scheme which starts to-day under such favourable auspices secures to every co-partner immunity from any haunting fear of the future, and, rightly considered, should be a further incentive to the exercise of thrift.

Another matter on which the Directors dwell with satisfaction is the formation of a Works Committee, the usefulness of which is already abundantly apparent. Since its establishment, it has had before it a considerable number of questions affecting co-partners, either individually or collectively; and with regard to every one of these, the decisions or recommendations have met with acceptance by all concerned. Judging, in fact, from present experience, it is difficult to imagine any method better calculated to promote complete harmony of working; and so long as that is the case, the Committee cannot but have before it a period of increasing usefulness.

You are all, as holders of the Company's stock, interested in the endeavour which is being made to obtain from Parliament a revision of the sliding-scale so as to enable the payment of dividends more adequate to existing conditions than the regulation £3 15s. p.ct., and the raising of further capital for the development of the undertaking. There is now a reasonable hope that something in this direction will be done before very long, which will at the same time admit of the application of a new bonus scale. It is, however, understood that any such financial improvement will be accompanied by more onerous conditions relating to the supply of gas, compliance with which will require the co-operation of all co-partners. On that co-operation the Directors fully rely.

In the great war, 1914-1919, 458 of the Company's employees took part. Of these, 58 laid down their lives.

The Town Council of Lochmaben have had under consideration the Gas Company's offer to sell their undertaking to the town for £2600. It was decided that nothing be done in the meantime.

SULPHATE OF AMMONIA ASSOCIATION.

Annual Report and Meeting.

The fifth annual report of the Sulphate of Ammonia Association (with which was incorporated the twenty-second annual report of the Propaganda Committee, together with a statement of accounts for the financial year ended June 30) was presented and adopted at the meeting, which was held on the 18th ult., at the Cannon Street Hotel—Mr. D. Milne Watson in the chair.

The following extracts are taken from the report, which the Executive Committee opened in these words: We concluded our last report with an expression of hope that it might prove to be the last of our war reports; and we record with profound satisfaction that the German war ended within a month of that report. Though our present report deals with after-war conditions, the events of the past twelve months have foreshadowed problems as difficult as any raised during the war. But if the contours of the difficulty have become more sharply defined, we believe that the outlines of the solution have also begun to assume more definite shape. The proposals for the formation of the British Sulphate of Ammonia Corporation, Ltd., which were circulated towards the end of 1918, met with a most encouraging reception—a measure of assent that would have been unthinkable four years ago. We must reserve for our next report a detailed account of these proposals, and of progress in their development; but we may state now that we have received promises of support from a large majority of the makers, and that we have every reason to hope that the Corporation will be in being and working when we come to submit our next report. We are not a little encouraged in this hope by the fact that towards the end of the year to which this report applies, makers, with one important exception, agreed to continue until May 31, 1920, the method of dealing with the output of sulphate of ammonia which has been in operation during the past two years. In its essential principles, this method represents what is aimed at by the Corporation (but, of course, without Government control); and the continuation of the Equalization Scheme for another year furnishes an opportunity for testing the foundations we are trying to lay for a more permanent Association.

Equalization Scheme.—The arrangements of last year have been continued; and a total quantity of 36,870 tons of sulphate of ammonia has been sold for export; the total sum realized being £1,050,700. The allocation of supplies required by the Ministry of Munitions was arranged by the Association; and it may be of interest to state that during the fortnight which followed the armistice we disposed of the Ministry's stock of about 6000 tons for agricultural purposes, 2000 tons of this quantity being actually in trucks *en route* for Swindon.

Agricultural Deliveries.—As mentioned in our last report, the Manager, as Joint Secretary of the Fertilizers Allocation Committee, transferred part of the staff to the Food Production Department in Victoria Street, in June, 1918, and worked there throughout the year. We are pleased to report a further very substantial increase in the agricultural deliveries, which rose to 269,000 tons, in spite of the fact that nitrate of soda was available (though at high prices) at the end of the season. Scotland consumed 67,500 tons; Ireland, 35,000 tons; England and Wales, 166,500 tons.

	Total Production of Ammonia as Sulphate of Ammonia.	Production of Sulphate of Ammonia as such.	Exported.	Used for Home Agricultural Use.	Nitrate of Soda used for Home Agrl. Use.
1913	432,600	*372,000	324,700	* 40,000	*80,000
1914	426,400	*363,000	313,900	* 50,000	*80,000
1915	426,300	*350,000	294,300	* 64,000	*40,000
1916†	433,700	315,500	160,300	144,600	* 5,000
1917†	458,600	283,500	28,500	234,000	* 5,000
1918†	432,600	331,500	38,400	269,000	*10,000

* Estimated. The nitrate of soda figures are only rough estimates.
† The figures relate to the fertilizer "year," commencing June 1 in each year.

Propaganda Work.—The whole system has been reorganized, with the object of getting into direct touch with as many farmers as possible. We have removed our agricultural offices to commodious and suitable premises at Preston, which is a better centre than Southport for this purpose. A small laboratory has been set up, and analyses of soils and samples of sulphate of ammonia and liquor have been made. Our Chemist (Mr. A. O. Blackhurst) has been assisted in this work by Mrs. Robinson and Miss James.

Experiments.—On the recommendation of the Sub-Committee a 20-acre demonstration centre has been acquired near Ormskirk, at a yearly rent and cost of about £200, on which a number of different plots have been arranged with a view to solving particular problems. A careful note is also kept of items such as rainfall and temperature. In addition to this, thirty-seven experiments have been arranged in England, covering nine counties (six wheat, three oats, three potatoes, one mangels, one meadow, one pasture, three seeds); eleven in Wales, covering three counties (five oats, two barley, two mangels, one meadow, one pasture); and thirteen in Ireland, covering seven counties (one potatoes, two swedes, two mangels, one hay and seeds, one hay, two oats, four flax). We are pleased to report that we have also been able to arrange with a number of agricultural colleges to conduct experiments for us, the results of which will be officially checked, with a view to obtaining some information on the difficult question of autumn *v.* spring application. We hope that the results will be sufficiently definite to enable us to publish a pamphlet on this question during the coming year.

Prize Competitions.—A cereal and root crop competition was again held. The entries for this amounted to 237, and were distributed over 33 counties; the majority of entries again coming from Staffordshire, Lancashire, Shropshire, and Cheshire. These figures represent a reduction on last year's figures, due chiefly to the lateness of the season. While general interest in the competition seems to be fully maintained, another reason for the falling-off in the number of entries in the southern counties is the feeling that these districts cannot compete with the richer land in counties like Lancashire. The Committee have therefore decided to have in future separate competitions for different areas.

Technical Developments.—During the year a number of new patents and processes for making neutral sulphate of ammonia have been published. The production of this quality is steadily increasing; but it is desirable that progress in this direction should be much more rapid. From a scientific point of view, the claim of the Germans to have produced synthetic urea may, if substantiated, have a far-reaching effect on the nitrogen problem.

Foreign Propaganda.—Work in Spain and Egypt has been continued by our officers in those countries. Scarcity of supplies was the chief difficulty encountered in the early part of the year in both countries; but latterly more sulphate of ammonia has been available. We have endeavoured, as before, to promote its use by personal visits, and the distribution of suitable literature.

Staff.—Though during the war the staff went through a very trying period, we think the year under review has been even more difficult; and again we have pleasure in testifying to the whole-hearted services rendered to the Association by Mr. F. C. O. Speyer in the management of its affairs. In fact, the whole of the Association's staff have worked excellently, including Mr. H. Jones, who was appointed Secretary to the Association in January last, in succession to Mr. A. Dawson.

Accounts.—At the last annual general meeting, it was resolved to defer the motion to adopt the accounts for the year 1917-18. At that time there was still a considerable sum of money due to the Association from agricultural buyers, in connection with the past season's trading; and there was a large and complicated claim against the Board of Agriculture and Fisheries for carriage charges in respect of deliveries undertaken by the Association early in 1917. A complete examination of these accounts has now been made; and the Board of Agriculture have paid the major portion of our claim. The balance-sheet now presents a satisfactory aspect. Messrs. Wood, Drew, & Co. offer themselves for re-election as Auditors to the Association.

The Chairman's Speech.

The Chairman, in moving the adoption of the report and accounts, said: With regard to the balance-sheet, you will remember we asked you last year to defer the adoption of the accounts until your Committee had had an opportunity of further investigating them. I regret the delay which has taken place; but it has enabled us to present a balance-sheet of satisfactory aspect, and I am advised by our Auditors that it will suffice if you agree to adopt the accounts as they stand. The work which we undertook in 1917 at the request of the Board of Agriculture, in distributing sulphate of ammonia in the home market, has resulted in a loss to the Association which we have written-off. But I would point out that, in respect of the few bad debts we made, the Association acted as a buffer and protector for its members. As to the remainder, I think this can be legitimately regarded as money spent on propaganda; for it was impossible for us to gain the knowledge of the home market which we have obtained without doing the business ourselves. I trust, therefore, that you will agree to adopt the accounts as they stand.

I think we have every reason to congratulate ourselves on the results shown by the report. We actually delivered last season 269,000 tons of sulphate of ammonia for agricultural use in the United Kingdom; and the fact that we have orders for close on 200,000 tons for the home market for the present season, in spite of largely increased quantities of nitrate of soda being available, clearly shows that the British farmer has come at long last to a right appreciation as to the value of sulphate of ammonia. Compared with pre-war quantities, as far as we can estimate them, last season's figure represents an increase in home consumption of nearly 700 p.ct.

It would be misleading on my part to attribute this result solely to the efforts of the Association; and I will not attempt to minimize the assistance which war conditions and the Board of Agriculture have given us. But I do say—without any fear of contradiction—that these results would not have been obtained without the driving force and power of co-ordination which the Association has shown itself to possess, and to be capable of exercising. I think I may claim, without incurring the reproach of vaingloriousness, that our war record as makers of sulphate of ammonia and as members of this Association has been an honourable one, and that we may fairly be considered to have made a substantial contribution towards providing the means whereby our glorious fighting forces, and the nation with them, were able to inflict decisive defeat on our enemies.

If I have carried you with me thus far, I feel that I may hope to command your assent yet again when I say that I earnestly hope we may be able to find means of utilizing our war experience in attempting to solve the greater difficulties with which we are faced in peace time. I had hoped that it would be possible for us to discuss to-day the details of the constitution and the form of agreement we have drawn up, with legal assistance, on the basis of the preliminary proposals we published early this year for the formation of the British Sulphate of Ammonia Corporation. The Special Committee dealing with this matter have, however, unfortunately been unable to complete their arduous labours in time; but I may say that both the memorandum and articles of what we now propose to call the "British Sulphate of Ammonia Federation, Ltd.," and the form of agreement which it will ask its members to sign, are printed.

I have every hope, therefore, that these documents will be in your hands early in January; and we propose to convene a further general meeting in January, or early in February, at which you will be asked to adopt and become members of the new organization. Although I fear that the documents may appear somewhat formidable at first sight, I would ask you to examine them in a sympathetic spirit, bearing in mind that they are, to a large extent, merely the legal expression for the practice which has been in force for the past two-and-a-half years under the Equalization Scheme. The meetings which were held throughout the country early this year [1919] showed that a large majority of sulphate of ammonia makers were in favour of the principles involved in the scheme; and the Committee have made every effort to

secure that the final proposals, which we are about to put before you, carry out the spirit of these principles.

In this connection, I would like to remind members how greatly the Equalization Scheme has benefited makers of sulphate of ammonia as a whole, and how smoothly and fairly the scheme has worked. To the smaller producers—especially the smaller gas companies, whose works are situated in agricultural districts—the Equalization Scheme has been of the greatest possible value. Without such a scheme, these small producers would have been unable to participate at all in the export market; whereas under the scheme they have received their fair share in the export prices, and have yet been able to sell all their make locally, thus keeping together their local connection—a very important point for the future.

We feel that the present time is a golden opportunity for consolidating the position of the Association, and that there is everything to lose and nothing to gain by postponing a decision on this vital question. I hope, therefore, that by the end of February the Association will have been transformed into the British Sulphate of Ammonia Federation, Ltd., in which form it will be able to continue and extend its work in a manner impossible for the Association as it is at present constituted.

The report and accounts having been formally adopted, and the Committees for the year ending June, 1920, elected, Mr. D. Milne Watson was unanimously re-elected Chairman of the Association, after a cordial vote of thanks to him had been proposed by Mr. A. Stanley (Simon-Carves, Ltd.), and seconded by Mr. G. C. Parnaby (South Metropolitan Gas Company).

The proceedings terminated with a hearty vote of thanks to the manager and staff.

SHEFFIELD GAS PURCHASE PROPOSAL DROPPED.

At a Special Meeting last Wednesday—the LORD MAYOR (Mr. S. Roberts) presiding—the Sheffield City Council, by a majority of 36 votes to 8 (three members being neutral), decided to omit from the Bill they are promoting in Parliament the clauses dealing with the purchase of the Gas Company's undertaking. There had been much opposition to the scheme.

At a previous meeting of the Council ["JOURNAL," Dec. 2, p. 502], there was considerable opposition to the proposal by the Labour members, on the ground that the price asked was excessive. The discussion was adjourned, for an effort to be made to secure better terms. The Parliamentary Committee now reported that they had not been successful in obtaining any modification of the terms—the Directors of the Company being of opinion "that the position of the undertaking is more favourable to the stockholders of the Company than it was in April last, when the original offer to the Corporation was made." In these circumstances, the Committee said, the courses open to the Council were (1) to accept the terms offered, (2) to make a counter offer to the Company, or (3) to drop negotiations. As to the first proposal, the Committee recognized that there was strong opposition in the Council and in the city to the proposed terms of purchase. In their opinion, it was not desirable to proceed with the proposal until there was more approach to unanimity in the Council than existed at present. As to the second point, the information obtained from the Company did not give any hope that an alternative offer which the Council might be expected to agree to would be acceptable to the Company. The Committee concluded by expressing the belief that the present time was inopportune to proceed with the scheme; and they recommended that the gas clauses in the Bill be dropped.

Alderman STYRING (the Chairman of the Parliamentary Committee) said he introduced the minutes with regret. The Committee had carried out the instructions of the Council in making an effort to ascertain if the Gas Company were prepared to modify the terms which were submitted to the Council with reference to the purchase of their undertaking. The result of these negotiations had been to show that no substantial modification could be obtained; and in these circumstances the Parliamentary Committee, having regard to the very large amount of feeling of opposition towards the purchase of the undertaking, had felt it was their duty to make the recommendation to the Council that the clauses with reference to the purchase should be omitted from the Bill. Frankly, he thought it was a very great mistake indeed. Sheffield had been waiting for a period of fifty years for an opportunity of taking over the gas undertaking; and now that the opportunity had come, they were very unwisely turning it down. Notwithstanding all that had been said, he thought that the terms offered by the Gas Company were fair and reasonable; and it would be better for the Corporation to be able to take over the undertaking by agreement rather than under any compulsory powers, because there would be substantially no displacement of capital. He could not agree that the gas undertaking was a "back number." It would be prosperous for very many years to come. Any temporary difficulties from which the gas undertaking was suffering in common with similar concerns, owing to the effects of the war, would soon disappear. Sufficient weight had not been given to the argument that the very large increase in gas consumption in the future would tend to cheapen the price. In one form or another the community had to carry the burden of the gas undertaking; and it became a question whether the works could be more economically and more advantageously carried on by the Corporation than by a public company. He had not the slightest hesitation in saying that the probabilities were greatly in favour of the undertaking being more satisfactorily carried on by the Corporation. As the result of his thirty years' experience of municipal management, he came to the conclusion that the Council were making a great mistake. They might have had to make some small sacrifices in the first stages; but in the end it would have proved greatly to the advantage of the city.

Mr. ARTHUR NEAL, M.P., said he was extremely disappointed with the minutes of the Parliamentary Committee. It must be known that the terms obtained were "rock bottom" terms, and not bad terms for the City of Sheffield. It was perfectly apparent that the Company were better placed now than they were before for driving a bargain; and he made bold to say that by accepting the uncourageous advice of the Parliamentary Committee, the Council were throwing away the golden opportunity that many of them had been waiting for during long years, to acquire the undertaking for the benefit of Sheffield. This opportunity would never return.

Mr. SIMPSON remarked that, though he did not believe that gas was by any means a "back number," he could not agree with Mr. Neal that the terms were fair and reasonable. They had to remember that before the Gas Company promoted their Bill in 1917 the stock of the Company amounted to £868,000 on which they were entitled to pay maximum dividends of 10 p.ct. They asked Parliament to authorize them to duplicate this capital, and make it up to £1,736,000, carrying a maximum dividend of 5 p.ct. It did not matter at all, as a question of revenue, whether 5 p.ct. was paid on the latter figure or 10 p.ct. on the former; but as a question of capital, there was a very great difference indeed. It practically meant they would be paying £868,000 for the goodwill of the Company. He could not go before his constituents, and tell them he had been voting to give £2,000,000 for assets which only stood in the books of the Company at a little over £1,000,000. He was obliged, very regretfully, to come to the conclusion that the best thing in the interests of the city was to drop the purchase clauses from the Bill.

Mr. BARTON said it did not seem to him to matter much whether they had £100 at 10 p.ct. or £200 at 5 p.ct. The Parliamentary Committee's conclusion was that they did not feel inclined to take over an undertaking on which the expenditure of considerable capital would be necessary, and which would not, in the long run, bring in a sufficient return for the capital that was put into it.

Alderman FENTON pointed out that Mr. Barton's premises about the future of gas were contradicted by scientists. No doubt there was a great future for it. Mr. Simpson had referred to the financial position; but neither he nor anyone else could say that the Company had not made sufficient money during the present year to pay their full dividends. The position was that they could not pay them in full until they reduced the price of the gas. He thought that in the ensuing session of Parliament, this limitation would be removed. The Corporation were not proposing to give £1,000,000 for the goodwill of the Company. It was well known that the Company's property stood in the books at very much less than its real value, because of the policy they had pursued of paying for their extensions and renewals out of revenue, instead of out of capital.

Mr. LAMBERT said that when the Company were before Parliament in 1917, it was stated on several occasions that, in order merely to carry on their work, it was necessary for them to spend £1,000,000 within the next ten years. As prices were now, this sum would probably be nearer £2,000,000. Was Sheffield in a position to saddle itself with such a burden?

Mr. LEDINGHAM thought that in the present conditions, and with the cost of money so high, it would not be to the benefit of the ratepayers to purchase the undertaking. The Company had managed the concern well, and Sheffield had had cheap gas.

Some further discussion took place; and after Alderman Styring had replied briefly to the remarks that had been made, the Committee's recommendation to drop the gas purchase clauses was adopted, as already mentioned.

WORK OF THE GAS CONSUMERS' ASSOCIATION.

Dealing, at a general meeting, with the work of the Sheffield Gas Consumers' Association, Mr. David Flather (the President) said that fortunately the question of gas quality had been referred to the Fuel Board, with Sir George Beilby at its head. He had gone a long way to help gas consumers by the manner in which he conducted his inquiries and researches. He had given as close attention to the requirements of the consumers as to those of the producers. In consequence of this, they might reasonably hope that a tremendously important step would shortly be taken in the right direction. If the suggested principle came to be adopted, it would be of enormous value to gas consumers and the nation at large. This was that people properly interested in these matters should be consulted before parliamentary action was taken. Another good thing coming from the intervention of the Fuel Board was that when the new Gas Act came out, consumers would be charged on the basis of the calorific value they received. It would not then be to the advantage of a gas company to dilute their gas with 30 or 35 p.ct. of non-combustible gas, because they would not be paid for it. At present consumers were paying for something which ought to be quite free—nitrogen. The Sheffield Gas Consumers' Association had reason to congratulate themselves, as well as to be grateful to the Fuel Research Board; for most of their recommendations had been adopted by the Board. Moreover, Sir George Beilby had said the Sheffield Gas Consumers' Association was the only one of its kind in the country, and had been a stimulating nucleus in obtaining the results which had come from the independent testing of gas, and had done much in protecting the interests of the consumer.

Brownhills Gas Company and the Council.—So bad has the gas supply become, that the Brownhills Urban District Council considered it advisable, last Wednesday night, to have before them the Secretary of the Gas Company, to give an explanation. The assertions made by the Council were that the gas supply was very bad, half the lamps only in the streets being lighted; and that some of the lamps were left burning all day. The Secretary offered an apology, and put forward the explanation that the apparatus in the automatic lamps was of German manufacture, and it was impossible to replace it. This was described by the Chairman of the Council as "very lame;" and it was also urged that the Council were paying nearly £700 a year for the supply of gas, and were by no means satisfied with the return they were getting for their money. The Council declared that if the supply did not very quickly improve, they would consider the advisability of breaking the existing contract, which they suggested the Company had already done. "If you would consider the question of the purchase of the gas plant, I feel sure the Directors would be pleased," was the reply of the Secretary.

OPPOSITION TO WANDSWORTH GAS COMPANY'S BILL.

The Wandsworth, Wimbledon, and Epsom District Gas Company have given notice of a Bill for the purpose of obtaining powers to erect works for the storage of gas on a site near the Elliott Schools, Merton Road, Wandsworth. Among the residents in the neighbourhood, there is strong opposition to the proposed scheme; and it is being urged that, having regard to the close proximity of several elementary schools, some action should be taken to oppose the Bill. In this connection, the Borough Council representatives of the ward have taken steps to submit the matter to the General Purposes Committee with a view to opposing the Bill in Parliament.

A largely-attended public meeting was held at Southfields on Monday of last week to consider what steps should be taken to defeat the Bill. The Chairman (Rev. J. W. Warren) said that it was proposed to erect gasholders opposite St. Barnabas Church. The only people, however, who could employ Counsel to oppose the Bill before the Parliamentary Committee were the occupiers and owners of any property within a certain radius of the proposed site. The Committee had, therefore, decided to approach the Borough Council, the London County Council, and other public bodies, in order to obtain their support against the Bill. They felt that they had a strong case, because the site was originally obtained for the purpose of housing people who had been turned out of their dwellings when the Gas Company enlarged their works at Wandsworth, and when a number of houses were demolished. There was a great dearth of houses at the present time at Southfields, and, in fact, throughout the borough; and any vacant ground was urgently required for the erection of new houses. Southfields was a residential district, and the erection of gasholders there would depreciate property, and reduce the assessable and rateable value of the district. The erection of the holders would be very disagreeable to the residents, and would have a serious effect on the 2000 or 3000 children who attended the elementary schools in the neighbourhood.

Mr. Wilson said that they opposed the Bill on the following, among other, grounds: (1) That Southfields was a residential district, and that there were houses all round the proposed site. (2) That the erection of a gasholder would depreciate the selling and letting of property, not only within the immediate radius of the site, but throughout the district. (3) That it would diminish the rateable and assessable value of the locality. (4) That there were many suitable sites within an easy distance of the proposed site. (5) That the site was secured for the purpose of erecting houses, and not for the erection of gasholders. (6) That within a short distance of the site there were several London County Council schools, containing thousands of children. They also objected to the Bill because the next war would be fought in the air; and they would be having bombs dropped on the holders which it was proposed to erect. The speaker went on to read a letter from Mr. Samuel Samuel, M.P., promising to oppose the Bill.

Mr. Stainsby pointed out that there was a clause in the Bill to enable the Company to erect gas-works in addition to gasholders. Though gasholders were objectionable, they were not half so objectionable as gas-works.

It was decided to ask the Borough Council to receive a deputation on the matter; and a resolution was unanimously passed approving of the action of the Committee, and pledging those present to support them in any steps they might take to oppose the Bill.

BELFAST GAS UNDERTAKING.

Requirements under the New Loan.—Reduction in Price.

At the January meeting of the Belfast Corporation, Alderman Coates, on behalf of the Finance Committee, announced the proposed issue by the Corporation of a loan of £500,000; the requirements being: For the gas undertaking, £50,000; for the tramways, £100,000; and for the new electricity station, £350,000.

At the same meeting, Alderman Craig, in moving the adoption of the minutes of the Gas Committee, which were agreed to, said there had recently been a great increase in the output of gas. The quantity produced from April 1 to Dec. 30 was 2097 million cubic feet—an increase of 168 millions over the corresponding period of 1918. On Dec. 22, a record was created in the output for 24 hours; the quantity being 13 million cubic feet, as against the previous record of 12½ millions. As to the price of gas, they had been in communication with the Government Department concerned; but the position was not very clear. He thought, however, that the reduction in the cost to consumers would be about 8d. per 1000 c.ft., to come into force from the 1st inst. The Committee had bought a cargo of 3000 tons of oil at 8d. per gallon, as against the present price of 11½d.

Mr. Squire said this oil purchase would mean a saving of £11,000. There was no doubt, he added, that the gas undertaking was going forward by leaps and bounds. The Corporation had voted a good deal of money for new machinery; and it would not be long until the works were extended.

Alderman Byrne held that consumers should get a concession in price as a result of the reduction in the cost of coal. They were told last month that the reduction would be 10d. per 1000 c.ft.

Mr. Doran described the gas now being produced as of inferior quality, and asked for information regarding the reduction to slot-meter users, 10,000 of whom had been installed in 18 months after he had first introduced the proposal.

Alderman Craig said he could not state exactly what concession would be made to consumers; but he thought the reduction would be 8d. per 1000 c.ft.

The Lord Mayor expressed satisfaction at the saving on oil, which was mainly due to the foresight of the Gas Manager (Mr. J. D. Smith), who had urged the Committee to buy at the time they did.

Alderman Wheeler drew attention to the inadequate lighting of the city streets, and the danger to pedestrian and vehicular traffic. He would like the public to know that the Gas Committee were not to blame, as the responsibility for public lighting lay with the Police Committee.

Mr. Davison, as Vice-Chairman of the Police Committee, said they had arranged for 1000 more lamps to be lighted as soon as the staff could undertake the work. There had already been a great improvement.

The "Northern Whig and Post" (Belfast), commenting on the position of the city gas undertaking, says: "During the first six months of the current year [1919], the output of gas was slightly larger than in the same period of the previous year, and there have been no labour difficulties or troubles regarding the coal supply. The heavily enhanced sale price charged for gas (3s. 8d. per 1000 c.ft., against 1s. 10d. pre-war) has enabled the management to meet increased charges for labour and materials and to earn a small margin of profit. It may be taken for granted, however, that the large annual balances, combined with cheap, good gas, which Belfast enjoyed for so many years, are a thing of the past." It is pointed out by the paper that the differentiation between expenditure for coal and receipts from residuals has become wider and wider, and it thinks the figures issued seem to need explanation, reference being made to a time, not so many years ago, when 9·4 p.ct. of coal cost was returned by the sale of coke and other residuals. In the opinion of the "Northern Whig and Post," the illuminating power of Belfast gas "has been reduced to such a degree that with a flame burner it is absolutely useless."

ACCRINGTON'S SERIOUS POSITION.

Few towns are so badly affected by the coal shortage as the six centres served by the Accrington and District Gas Board. Here the works have followed a hand-to-mouth policy for weeks, owing to the failure of supply; and telegrams have been sent to the Coal Controller, the Board of Trade, and other quarters. On Wednesday, a deputation from the Accrington Corporation waited on the Divisional Controller in Manchester. The position is getting so acute that it has been suggested a deputation should proceed to London to interview the Premier. Meanwhile, there are rumours of drastic action by the trade unions, unless the position improves.

The serious position existing was described by the special correspondent at Accrington of "The Times," in last Wednesday's issue, in the following terms.

Accrington and the four neighbouring towns of Church, Rishton, Clayton-le Moors, and Great Harwood, as well as a portion of Haslingden, which all depend for lighting on the gas supplied by the Accrington District Gas Board, will be entirely without gas by breakfast-time to-morrow, unless in the meantime the Board can put its hand on a supply of coal. If there is no gas, there will be no work in the mills should the day be as foggy as to-day has been; and the 15,000 families that depend upon gas-stoves for cooking will be unable by the customary means to warm their food.

Speaking broadly, a population of 90,000 persons will be without work and essential light. Six railway stations will have to fall back on improvized illumination; and warning has been given to the Lancashire and Yorkshire Railway Company that the Gas Board cannot guarantee from day to day the supply of gas for the railway signals. There is at present no public lighting in these five towns between ten o'clock at night and six in the morning. The pressure has for some time been reduced to the very minimum consistent with safety.

The Gas Board needs about 1200 tons of coal a week. To-day it has not a single pound of coal in reserve at either of its works. Six wagon-loads of coal arrived from South Wales during last night; and it is being unloaded straight into the retorts. These six wagons are understood to be part of a consignment of eighteen wagons; but why it should be necessary to import coal to Lancashire from Wales, nobody here seems to understand. There are five pits in the immediate neighbourhood of Accrington which could supply a quantity of coal much superior to the black dirt which came last night from so far away. Ordinarily the Accrington Gas-Works would draw upon South Yorkshire for their coal; and they were able, although working on the narrowest margin of stocks, to get spot lots of Yorkshire coal until the Order reducing the price of domestic coal took effect. Then the Yorkshire collieries advised the Gas Board that they could not continue to send these spot lots. No reason was given; but it can without doubt be found in the fact that 60 p.ct. of the Accrington Gas Board's output goes into domestic consumption, and therefore on 60 p.ct. of its coal the Board would be able to claim a 10s. abatement of the price. But while the gas-works are without coal, the industrial works are amassing stocks. There has apparently been no diminution in the tonnage of coal coming into the town; but it is going in different directions.

The gas-works were in danger of closing-down at Christmas; but the local Fuel Overseer, acting with a temerity which is reported to have earned him an official rebuke, commandeered 100 tons of coal consigned to industrial works. The local Fuel Overseer has declared that a large proportion of the so-called industrial coal that is arriving in the town is really household coal. Three days before Christmas he examined the coal in 136 wagons in Accrington sidings. Twelve of the wagons were labelled "household fuel," and the rest "industrial fuel." He found that it was all household fuel. There are many complaints from householders in the district that they cannot get coal to warm their homes. The local Fuel Overseer is asking permission to make use of his small accumulated reserve of 250 tons to ameliorate the sufferings of the people, which are acute to-day with the temperature well below freezing-point. At the time I arrived at the local Fuel Overseer's office, a woman was plaintively appealing for coal to warm the bedroom where an old man has been lying ill for a fortnight.

The official view of the trouble in regard to supplies of coal to the Accrington district is that it is due to transport difficulties. Yesterday afternoon a conference was held at the Ministry of Transport to consider what steps could be taken to relieve the situation. The meeting

was attended by officials from the Coal Controller's Department and representatives of the railway companies; and arrangements were made for the provision of trucks to carry coal to the districts where the shortage exists.

At the monthly meeting of the Gas Board on Thursday, the General Manager (Mr. A. J. Harrison) reported that since the previous meeting, when an urgent appeal was sent to the Coal Controller with regard to the shortage of coal, not a single day, excluding Sunday, had passed without him sending some communication by wire, or telephone, or letter, to the Controller, the District Committee, or else to the collieries. The present restrictions on public and private lighting meant a loss to the Board of £1000 a week in revenue; and, apart from the inconvenience to the public, this was a serious matter. The only result of all his appeals was that on one occasion twelve wagons of coal arrived from South Wales; but the stuff was very bad. On Jan. 5, he sent out an "S.O.S." message; and in response he got a letter from the Controller, who said that he had asked the collieries to help them. They had not in stock as much coal as the ash on a cigarette tray. As a result of the interview he had with the Divisional Officer in Manchester, who had nothing whatever to do with gas undertakings, they got thirteen wagons on Wednesday and another thirteen that morning.

In regard to household fuel, the Chairman of the Board said they would endeavour to supply coke in small quantities at the gas-works; but owing to the quality of the coal, this coke was not so good.

All public street lighting has been cut off. It is reported that "a wave of indignation has spread over the town following the statement made at a meeting of the Town Council by Mr. W. J. Newton, Local Fuel Officer, that there has been a very large number of wagons of coal in the railway sidings which, though labelled "Industrial coal," were in reality domestic coal diverted to industrial purposes.

MACCLESFIELD GAS EXTENSIONS AND FINANCES.

The Gas Committee of the Macclesfield Corporation have had under consideration the report of the Engineer (Mr. F. W. J. Belton) upon replacing the present atmospheric gas condensers by up-to-date water-cooled condensers, replacing the tower scrubbers by a Livesey washer and centrifugal scrubber, and erecting an ammonia plant. Competitive tenders which had been obtained showed that the total cost would amount to nearly £11,000. After a lengthy discussion, the matter was referred to a Sub-Committee for consideration.

At the monthly meeting of the Town Council on Wednesday last, Alderman Harrison expressed surprise at the heavy expenditure foreshadowed by the Gas Committee, in view of the fact that they had an overdraft at the bank of £9716, whereas at one time they had a maintenance fund of £10,000. The schemes they had in hand were estimated to cost about £10,000; and he would like to know where the money was coming from, seeing that their borrowing powers were now exhausted. Was it proposed to meet the contemplated expenditure out of revenue? Mr. Pimblott said there was no need for alarm at the overdraft at the bank; for it was amply covered by valuable assets. The explanation was that the Gas Engineer had, with the approval of the Committee, made large purchases of cooking-stoves, gas-fires, &c., which would prove a profitable investment. With regard to the scheme which had been submitted to the Gas Committee, before the Council sanctioned any expenditure, they would have an opportunity of discussing the project when the Sub-Committee presented their reports. Mr. W. R. Brown protested against the policy of the Committee in meeting capital expenditure out of revenue. Alderman Frost thought the Committee deserved credit for having such a small overdraft as £9716, seeing they possessed property of the value of £250,000, and that the price of gas in Macclesfield was among the lowest in the country. If the gas-works were to continue to be successful, they would have to be kept up-to-date.

The minutes were adopted.

NOTTINGHAM GAS SUPPLY.

Discussion in the Council.

Dissatisfaction which has been generally expressed in Nottingham at the indifferent quality of the gas supplied to the city, led to the adoption of a resolution at the December meeting of the Corporation, relegating it to the Gas Committee to consider whether some improvement could not be effected. The Committee's report, indicating that all that is possible is being effected under present exigent circumstances regarding coal supplies, came up for consideration at the last meeting of the Council on Monday, the 5th inst.

Alderman A. BALL (the Chairman of the Committee) said that everything had been done which could be devised. Improvement in the quality of the gas was impossible in the absence of adequate coal supplies. It had been suggested at a previous meeting of the Council, that the Committee had refused to accept coal. He took up the matter with the Midland Railway Company, who replied that such a statement had no foundation.

Mr. H. G. FORD (the Vice-Chairman of the Committee) declared that the real difficulty was due to a shortage of wagons, and not to an actual shortage of coal. The trouble arose almost entirely from the present inefficient system of transport. Within the preceding three or four days, however, there had been a complete removal of the congestion of traffic in the Nottingham area—for the first time since the beginning of the war. A mistaken impression prevailed that the insufficiency of wagons was due to so many being retained in France; but this was not a fact, as they were being returned at the rate of something like 3000 to 4000 a week. He himself had submitted recently certain practical proposals to the Transport Ministry, with the result which he had mentioned in regard to the Nottingham area. They were up against an artificially created shortage of wagons and coal supplies.

Mr. H. BOWLES (the leader of the labour party in the Council, from whom the resolution had emanated referring the matter to the consideration of the Committee) expressed the view that the Committee had not done everything that was possible, even under present abnormal conditions, to improve the quality of the gas. They were simply "crying over spilt milk." He was in a private house on the previous night when, upon a second gas-jet being lit, the first one went out. At a time, therefore, when the Corporation proposed to apply for powers to extend the municipal boundaries, they had a gas concern which would not permit of two lights being burnt in one house. The bad quality of the gas had choked and spoilt private pipes and fittings; and consumers had had to pay plumbers to put them right.

Mr. T. PARKES contended that, if consumers could not obtain better gas, they were at least entitled to the present supply at a cheaper rate. He compared the price with that in other towns.

Alderman BALL said it was all very well to talk about cheap gas in other towns; but it did not follow that the quality was better. Some of Mr. Parkes' labour colleagues were on the Gas Committee, and knew exactly what was being done. Nottingham would be very lucky to get gas at all in a few weeks' time, unless they had better coal supplies. But the weak spot was transport. There were a smaller number of blocked service-pipes in the Nottingham area at present than at any time in the history of the undertaking. It was impossible to obtain new mains (owing to the iron moulders' strike) or to make better gas (owing to the coal and transport shortage). The Committee could not do more than they were doing.

The report was adopted; and a resolution upon the *agenda* that the Committee should be instructed to light a further 25 p.ct. of the public lamps of the city (making 75 p.ct. in all) during the months of January, February, and March, was withdrawn.

COAL SHORTAGE AND WEST RIDING GAS SUPPLY.

Throughout the West Riding area the acute shortage of coal, as well as its bad quality for gas-making, is creating a great deal of trouble and consternation.

At Bradford, the Gas Engineer (Mr. Chas. Wood) states that unless a considerable improvement takes place within a few days, the lighting of the city will have to be cut-down. The quantity of coal used per day is 700 tons; and the supplies promised by the Coal Controller before Christmas have not yet arrived. The bad quality of the coal sometimes results in as much as 20 p.ct. having to be washed. The part of Bradford which in normal times takes a supply from the Pudsey Gas Company is now having to be supplied from the Bradford mains; and this has greatly accentuated the difficulty.

Shipley is about as badly placed in Bradford; and the trouble there has been accentuated by a strike of boatmen on the canal, by which a great deal of the local coal is brought to the town. The industrial undertakings are in a much better position in regard to coal stocks than are the gas-works. The gas-works have only a few days' supply. The electricity works have enough for about five weeks.

Hebden Bridge, so far as night street lighting is concerned, was thankful for moonlight last week, as there was only about a week's supply of coal at the gas-works; and the lamps were left unlit. On other than moonlight days the lighting is being curtailed. At Silsden, the position created by the low pressure and poor quality of the gas is assuming a grave aspect. The Marsden area, at the moment of writing, has only eight days' supply of coal at the gas-works. In the Calder Valley, public lighting has been curtailed, and the gas pressure generally is reduced. The Yeadon District Council last week issued a strong request for the utmost economy in household and industrial use of gas owing to the low stock of coal.

In nearly every instance the onus of complaint is the same—bad quality and short quantity of coal. The various authorities are putting every possible pressure on the Government; and there is every prospect of serious industrial loss, as well as household misery, if the coal situation is not quickly improved.

DUNDALK GAS COMPANY'S VALUATION.

At the Dundalk Quarter Sessions, the Urban District Council appealed against the decision of the Committee of Valuation in respect of the Dundalk Gas Company's mains, service-pipes, and easements above ground—holding that a reduction from £300 to £120 was unreasonable, and did not represent the annual value.

On behalf of the Valuation Office, Mr. C. H. Mills said the valuation was made from the accounts. Mr. George Airth (the Manager of the gas-works) said in 1911 they had an output of 54 million c.ft., and the receipts amounted to £2748; and they paid 10 and 7 p.ct. respectively on their "A" and "B" shares. In 1918, their receipts were £1841; and they paid 5 p.ct. on the "A" shares and 3½ p.ct. on the "B" shares. They had only installed four cookers in Urban Council houses, which they had to upkeep, and for which they were allowed no depreciation. The total number of cookers in the town was 574. They had 920 slot-consumers, and in 1918 they received £3648 from them. He then submitted the following capital figures: Building and plant, £10,990 approximately; mains and services, £6250; meters and cookers, £4706. Some 150 cookers had been put in during the last ten years. In the result, his Honor Judge Green increased the valuation by £65, making it £185.

Messrs. J. & W. B. Smith, Ltd., of Farringdon Road, E.C., call attention to a new design of show-card and poster (printed in six colours) which they have just introduced to advertise their "Glasmi" mantles. The poster bears the inscription "That's Good;" a unique feature of the picture being a laughing cat glancing up at a lighted "Glasmi" mantle.

SOUTHAMPTON GAS EMPLOYEES AND THE WAR.

Nearly 600 employees of the Southampton Gas Company were the guests of the Directors at a dinner and smoking concert, held at Southampton last Wednesday evening. Primarily, the gathering was to celebrate the return to duty of the employees of the Company who served in the forces during the war; but an even greater object was achieved in the further deepening of the harmonious spirit which happily exists, and has existed for so long, between the Directors and their employees. If the proceedings can be taken as an augury of the future relations between Directors and staff, then the Company has before it an era of prosperity which has never before been equalled. Though the gathering was to celebrate the return of the victorious, it would not have been fitting if the memory of those who had made the great sacrifice had gone unhonoured. Immediately following dinner, those present paid a silent tribute to their fallen comrades.

"Our Comrades of the Great War" was the principal toast; and Dr. Russell Bencraft, J.P. (a Director), who presided, gave the record of the employees during the war. In 1914, he said, the Company had 456 employees; and of these 146 had joined the Colours. Eight had made the supreme sacrifice, and 118 had been received back into the Company's employ, in fulfilment of the promise that all positions should be kept open. The Board were ready to welcome the rest of the men when they left the forces. Three decorations had been gained by their employees. Captain Bartholomew had had a record of which he might be particularly proud. He joined up as a Lieutenant at the age of 58, and succeeded in gaining a captaincy; and he was awarded the Military Cross. Lieutenant Hickman, who was unhappily killed, and Private Palmer each gained the Military Medal. The Directors had decided to allocate a sum of money, which had been set aside in the early days of the war; and each single man would receive £5, and every married man £2 10s. The difference was made because the Board had done their best during the war to assist the married men to keep their homes going; and it was felt that the single men, who had drawn nothing, were therefore entitled to receive a little more. Dr. Bencraft alluded at some length to the difficulties which gas companies generally had had to meet during the war, and said that no class of people had suffered more than gas stockholders. The employees had been assisted as far as possible, by war bonuses and increased wages, to meet the extra cost of living; but there were many people, with responsibilities equally as great, who had to live on decreased dividends or without increases of wages or war bonuses.

In proposing "The Prosperity of Our Company," Lieutenant-Colonel H. W. Woodall (the General Manager of the Bournemouth Gas and Water Company) pointed out that unity and courage, which were so essential during the war, were absolutely necessary in peace time for the success of any undertaking. Incidentally, he paid a compliment to the Company upon the fact that there had never been trouble between the Directors and the staff.

The General Manager of the Company (Mr. J. R. H. Jacobs) emphasized the fact that the prosperity of any company depended very largely on the efforts of the employees; and he appealed to every member of the staff to realize his own personal responsibility in this direction.

The speeches were interspersed with excellent musical items.

CURRENT SALES OF GAS PRODUCTS.

The London Market for Tar, Tar Products, and Sulphate.

LONDON, *Jan.* 12.

The whole tone of the London tar products market is exceedingly firm, and business is brisk. There is plenty of demand for pitch, and the price continues to advance; makers' quotations being to-day not below 90s. per ton f.o.b. makers' works. The demand for creosote is greater than the supply; and the price to-day is firm at from 8d. to 8½d. per gallon net in bulk. Tar spirits are scarce; pure benzol and pure toluol being firm at 3s. per gallon, and solvent naphtha from 3s. 3d. to 3s. 6d. per gallon. There is considerable revival of demand for pyridine; and makers are now awaiting developments in the expectation of higher prices.

In sulphate of ammonia there is nothing new to report.

Tar Products in the Provinces.

Jan. 12.

The average values for gas-works products during the week were: Gas-works coal tar, 53s. to 58s. Pitch, East Coast, 92s. 6d. to 97s. 6d. per ton f.a.s.; West Coast—Manchester, 80s. to 85s.; Liverpool, 80s. to 85s.; Clyde, 85s. to 90s. nominal. Benzol 90 p.ct., North, 1s. 11d. to 2s.; crude 65 p.ct. at 120° C., 1s. 1½d. to 1s. 2½d. naked at makers' works; 50-90 p.ct. naked, North, 1s. 10d. to 2s. Toluol, naked, North, 2s. 1d. to 2s. 2d. nominal. Coal tar crude naphtha in bulk, North, 9½d. to 10d. Solvent naphtha, naked, North, 3s. to 3s. 2d. Heavy naphtha, North, 2s. 7d. to 2s. 9d. Creosote, in bulk, North, liquid, 6⅝d. to 7½d.; salty, 6d. to 6⅝d. Heavy oils, in bulk, North, 7d. to 7½d. Carbolic acid, 60 p.ct., 3s. 3d. to 3s. 6d. Naphthalene, £18 to £22; salts, £6 10s. to £7 10s., bags included. Anthracene, "A" quality, 7½d. to 8d. per minimum 40 p.ct.; "B" quality, nominal.

FROM A MARKET CORRESPONDENT.

Tar Products.

There is much uncertainty in markets, though, generally speaking, sellers are looking for higher prices, and are consequently little inclined for business. In some quarters the continued advance is ascribed to the reduced purchasing power of money; and one cannot say how far this may extend. Transport difficulties are still acute. The position in pitch is very strong, although by no means regular, and it is difficult to record anything like exact quotations. Among prices mentioned are 90s. Manchester, 95s. on rail Midlands (which would mean 105s. or thereabouts in South Wales), 98s. London. These are probably extreme quotations; but the position is very strong, and it is difficult to see where the advance is likely to end. There has been a considerable increase in the demand for naphthalenes; and crudes are particularly wanted at advancing rates. There are very small offerings of refined sorts. For powdered, in casks, 27s. per cwt. is asked; flake makes 23s. per cwt.; and ball naphthalene 42s. per cwt. The naphthas are unchanged. Creosote is advancing, and quotations are difficult to fix. Sellers are expecting another advance, and are doing very little at 7½d. in the Provinces. Cresylic acid is again a shade dearer, and crude carbolic acid has reached 3s. per gallon. Crystals are difficult to find, and, when available, make about 1s. 2d. per lb. There is no particular change in intermediates. Export licences are being refused in many cases, and business is going to America as a result. Aniline oil (drums free) is 1s. 5d. to 1s. 6d. per lb.; but aniline salts are practically unobtainable on spot, while for Spring delivery 1s. 10d. to 2s. per lb. is asked.

Latest quotations are as follows:

Benzol: 90% London 2s. to 2s. 2d., North 1s. 11d. to 2s.; 50-90% 1s. 9d. to 2s. London, 1s. 10½d. North; crude, 60-65% 1s. 5d. to 1s. 7d.; pure, 3s. per gallon naked.

Carbolic Acid: Crude 60's 3s. per gallon nominal; crystals, 40%, 1s. to 1s. 2d. per lb.

Crude Tar: London, 50s. to 55s.; Midlands, 50s.; North, 50s. per ton *ex* works. Refined tar, 32s. 6d. per barrel (free) on rail.

Pitch: London, 95s. per ton; East Coast, 85s. to 90s. per ton; West Coast, 87s. 6d. to 90s., with Manchester 85s. per ton and Glasgow 87s. per ton; South Wales, 100s. per ton.

Solvent Naphtha: London, 3s. 3d. Provinces average 3s. 4d. per gallon.

Crude Naphtha: Naked, 9d.; North, 8½d. per gallon.

Heavy Naphtha: 2s. 6d. per gallon.

Naphthalene: Refined, £23 per ton nominal; crude, £8 to £11, according to quality.

Toluol: Naked, 2s. 9d. per gallon nominal. North, 2s. 7d. Pure, 3s.

Creosote: London, 7½d.; North, 6½d. to 7d.; heavy oil, 6d. per gallon in bulk.

Anthracene: 40-45%, 9d. per unit per cwt.

Grease Oils: 18° Tw. (naked), £6 10s. per ton f.o.r. makers' works.

Aniline Oil: 1s. 7d. to 1s. 8d. per lb., drums free.

Cresylic Acid: 95%, 3s. to 3s. 3d.; 97-99%, 3s. 3d. to 3s. 6d. per gallon *ex* works London, f.o.b. other ports.

Carbolic Acid: Crude 60%, 3s. per gallon; crystals 40%, 1s. to 1s. 2d. per lb.

Sulphate of Ammonia.

Trade shows signs of improving, the recent heavy rains having washed-out the ground considerably in some parts, thus rendering the replenishment of plant food a matter of urgency. Export demand has remained quiet. Many foreign countries are most anxious for sulphate of ammonia; but what with high freights and loss on exchange, prices are too high for them. The annual report of the Sulphate of Ammonia Association, just presented, shows a very substantial increase in agricultural deliveries, which rose to 269,000 tons in spite of the fact that nitrate of soda was available at the end of the season. Scotland consumed 67,500 tons, Ireland 35,000 tons, and England and Wales 166,500 tons. These figures, so far as can be estimated, represent an increase in home consumption of nearly 700 p.ct. compared with pre-war quantities. During the past year a number of new processes and patents for the making of neutral sulphate have been published. The production of this quality is steadily increasing.

Progress of Joint Industrial Councils.

A review of the progress made by the Joint Industrial Councils and an outline of some of the achievements of these bodies are contained in "Bulletin No. 2," issued by the Industrial Councils Division of the Ministry of Labour. The total number of these Councils now reaches 51; and the opinion is expressed that nobody who takes an interest in the Whitley movement can regard the record of what has been accomplished as other than encouraging. The summary of work done since last July is divided into sections; but it is merely intended to give a general idea of the achievements of the Councils, and does not profess to be in any way exhaustive. In the section relating to "Welfare, Safety, &c.," under the heading of gas, it is stated that the Council have agreed to request the Home Office to send a representative to any meeting at which questions of welfare or the prevention of accidents are to be discussed. Among the District Councils which have been set up or are in process of formation, are those for gas in the following areas: Scotland, Northern Yorkshire (West Riding), Manchester, Eastern, Midlands, South Wales, Southern, South-Western, and London. It should also be mentioned that, in addition to the 51 Industrial Councils already in existence, negotiations are proceeding for the constitution of similar bodies in connection with no less than a dozen other industries and professions.

Doncaster and Coke-Oven Gas.—The Doncaster Gas Committee, having further considered the correspondence with the Maltby Main Colliery Company, Limited, with respect to a supply of coke-oven gas to the Corporation, decided last week to take no further action in the matter at the present juncture—having regard to the length of piping required, and the cost.

Knaresborough Gas-Works Expenditure.—For the first time in the history of the Knaresborough Urban District Council, there is no money at the bank. With the accounts for December, a sum of £1500 was required; and to meet it there was a matter of £300 or £400. It is alleged that the local authority have been extravagant in connection with the gas undertaking, the estimated cost of certain works having been far exceeded. At a meeting of the Council, it was decided to ask permission to borrow £2000, in addition to the £1000 bank overdraft; and it is proposed to spend £1000 on the gas-works.

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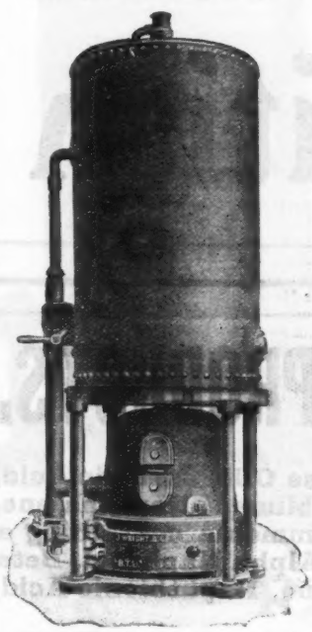

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Rising Costs in the Gas Industry.

In an article to the papers, dealing with the price and quality of gas, Mrs. Cloudesley Brereton, the British Commercial Gas Association's Editor, says that the price of gas in 1913 for the greater part of London was 2s. 6d. per 1000 c.ft.; in 1919 it was 4s. 8d. per 1000. "But," she goes on (showing that the rise is justified), "consider the cost of coal and labour to one of the largest undertakings. Coal, which in 1913 cost 16s. per ton, including freight charges, can only be bought now at a rate of over 40s. per ton. Thus, while the price of gas has risen by 86 p.ct., the price of the raw material from which gas is manufactured has risen by as much as 150 p.ct. At the same time, the cost of labour has mounted up by nearly 120 p.ct. These figures speak for themselves. Taking the cost of coal charges by one typical company, let us consider the percentage of the return of residuals obtained therefrom during the last five years compared with the previous period of five years. The figures work out at 66 as compared with 82. Put in other words, from every £100 worth of coal bought during the last five years, the company recovered £66 in the form of residuals, whereas during the previous five years they recovered £82. The return for coke alone during the corresponding periods was only 40 p.ct. of the cost of the coal, as against 50 p.ct.

Thirsk Gas Consumers' Experience.—A "peculiar smell" from the gas has lately inflicted itself upon consumers at Thirsk. It was most noticeable during the evening when the lights were on; but it also made its presence felt in the daytime. The first complaint was a fortnight or three weeks ago; and afterwards the smell got gradually worse. It was explained that the cause of the trouble had been a new washer at the gas-works, which did not work properly. Ultimately, a well-known engineer was called in; and on the following day a decided improvement was noticeable.

Difficulties of the Whittington Gas Company.—At a meeting of the Whittington and Newbold Urban District Council, a letter was read from the Chesterfield Gas and Water Board stating that 25 p.ct. more lamps in the Council's district would be lighted. But the Whittington Gas Company informed them that they had only one week's supply of coal in hand; and unless the Coal Controller could be induced to do something, they would be compelled to reduce the pressure of gas to a minimum. The Clerk (Mr. H. J. Watson) said that in November last the Company informed the Coal Controller that they had only four weeks' supply of coal in hand; and his reply was that, as many gas-works had only one week's supply, it would not be possible to allocate any emergency coal. Mr. Graham asked if it was not a fact that the Coal Controller had been sending coal from the North of England to Derbyshire—and coal not half as good as they could get in their own district. Then the coal from the Chesterfield area was going to the North of England, with all the consequent waste in carriage. A suggestion was made that a strong complaint be addressed to the Coal Controller; but no action was taken.

Stockton-on-Tees Vertical Retort Scheme.

At last week's meeting of the Stockton-on-Tees Town Council an interesting intimation was made by the successors to the Otto Coke Oven Company, Ltd.—interesting, that is, in view of the Corporation's recent decision to instal a system of vertical retorts at the gas-works at a cost of £55,475. It was that Messrs. Sir W. B. Samuelson & Co. had given a repeat order for 65 ovens identical with those supplied by the Otto Company five years ago, and from which the Middlesbrough Corporation receive their supply of gas for lighting purposes. It was suggested that, as this type of carbonizing plant could be successfully adopted by works making more than 250 million c.ft., the Corporation should consider it as against vertical retorts. In reference to this latter scheme, a letter was read from the Ministry of Health stating that, while the proposal was satisfactory, permission could not be granted for the whole of the loan, as the borrowing power of the Corporation was only £30,259. The Ministry had therefore agreed to sanction a loan of £30,000, so that the work might be commenced, on the understanding that the Council made application for a Provisional Order extending their borrowing powers in connection with the gas undertaking. On the recommendation of the Gas Committee it was decided to make the application advised for additional borrowing powers to the extent of £50,000; and the Town Clerk was instructed to inquire of the Woodall-Duckham Company, Ltd., whether there was now any variation in the price they had quoted for the erection of the retorts. Mr. Robson asked if the Gas Committee had taken the Otto Company's suggestion into consideration; and Alderman Nattrass observed that, pending the appointment of a new Gas Manager, it might be advisable to stay their hands in regard to any alterations at the works. The Town Clerk (Mr. T. Downey) said the Committee would, he believed, await the appointment of a new Manager before fixing up the contract, and would also take into consideration the letter from the Otto Company.

Teignmouth Gas-Works Extensions.—A report on the gas-works was presented last Tuesday by the Manager (Mr. Harold Higham) at a meeting of the Teignmouth Urban District Council. Mr. Higham mentioned that the price of gas would be increased to 6s. 9d. per 1000 c.ft. for the last quarter of the financial year. Further expenditure on extraordinary repairs to the works undertaken included the setting of another boiler and the re-setting of three retort beds, amounting in all to £1250, of which £500 was paid in wages for direct labour. The total excess of expenditure over last year was £4250. The only way to reduce the present high cost of gas manufacture was to instal more modern methods of production. The Council approved of the advance in the price of gas from 6s. 3d. to 6s. 9d. In connection with the scheme for reconstructing the gas-works, the Council accepted the terms offered by the Great Western Railway as owners of the land required, subject to certain conditions.

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British Industries' Fair—Birmingham Section.

The arrangements for the British Industries' Fair (Birmingham Section), to be held at Castle Bromwich aerodrome from Feb. 23 to March 5, are approaching completion. The exhibitors number 650, and 100,000 square feet of space has been taken. The chief feature will be general hardware and engineering—the latter being represented by some 200 firms. All classes of brass foundry are to be adequately covered—particularly in relation to hot and cold water and gas and electric light fittings; and in view of the national housing schemes, it would appear that manufacturers are paying special attention to the claims of builders' ironmongery, grates, gas ranges and stoves, and electrical appliances in domestic use. The section devoted to chandeliers, candelabra, gas-fittings, electric light fittings, and accessories, and lamps of all kinds, is extremely well covered; and interesting developments are promised by enterprising firms. The tube industries will, it is anticipated, make a big display.

Ulverston Gas-Works Management.—It was reported to the Ulverston Urban District Council that the Ministry of Health had asked for an explanation as to why the Council's Surveyor and Nuisance Inspector had been given the additional work of Gas and Water Manager. It was decided that the Clerk should consult the Chairmen of the Gas and Health Committees on the drafting of a reply.

Perth Gas Supply Complaints.—The quality of the coal that is being supplied to the Perth Gas-Works has been further discussed. At a meeting of the Gas Committee a communication on the subject was read from the Falkirk Town Council; and it was agreed to join Falkirk in an endeavour to secure a better quality of coal for gas-making purposes. Some of the residents have been asking the electricity department to substitute electrical illumination in their houses in place of gas.

Kegworth Gas Company's Powers.—At a meeting of the Castle Donnington Rural District Council, the question of the Kegworth Gas Company and their powers was discussed. The Clerk read a letter from the Secretary of the Company stating that they had no statutory powers. They had, he said, been supplying gas for 54 years in Kegworth. The Clerk mentioned that, although the Company had no statutory powers, if any other party wished to come in, the original Company would probably apply for powers; and in the event of such powers being granted, the newcomers would be ordered out. The Chairman (Mr. W. P. Woolley) said that, when the Kegworth Local Authority were at variance with the Company, the Local Government Board intimated that so long as the Kegworth Gas Company were willing to supply gas, no other company would be allowed to come into opposition with them. The Clerk said that this reservation would not apply in the case of an electric light company. It only concerned gas. If they desired, the Local Authority could light the town with electricity. It was decided to give the Gas Company an opportunity of improving the gas before taking further action.

New Gas-Works for Blackburn.—The Blackburn Gas Committee have received permission from the Ministry of Health to proceed with the erection of the new gas-works at Greenbank, and sanction has been given to borrow £139,668 for the purpose.

An Officials' Strike at Drogheda.—At a meeting of Drogheda Corporation the Gas Committee reported that James Gorman (accounts collector), John Gorman (delivery clerk), and William Byrne (rental clerk) had gone on strike, on their request for £1 a week increase in wages not being acceded to. A long discussion ensued as to the hours, &c., of the officials named; and ultimately it was decided to advertise for men to fill the vacant places. It was pointed out that, by leaving work without notice, the men had dismissed themselves.

Proposed Purchase of the Altrincham Gas-Works.—It was stated in the Altrincham Town Council last Tuesday that, at a meeting of the General Purposes Committee, the Clerk had reported that, under the instruction of the Council, the motion by Mr. Wild with reference to the proposed purchase of the Altrincham Gas Company's undertaking came up for discussion. He had looked up particulars of the proceedings of the conference of local authorities when the matter was previously dealt with, in 1907 and 1908, and gave the Committee a *résumé* of what transpired. Further consideration was adjourned.

Increase in Price by the Wandsworth Gas Company.—The Wandsworth, Wimbledon, and Epsom District Gas Company notify an increase of 6d. per 1000 c.ft. in the price of gas (to 4s. 2d.), to take effect from the Christmas meter readings. The Directors explain that for a long time past the price of the Company's gas has been insufficient to meet the largely increased, and still increasing, expenditure on coal, labour, and necessaries for upkeep. The Company are unable to earn adequate dividends; while the vain struggle to maintain the present low price of gas has resulted in the depletion of reserves and balances. To meet the position, an addition of 8d. per 1000 c.ft. is estimated to be necessary; but it is considered well that a quarter of this should be accepted as shareholders' risk.

Loughborough Gas Undertaking.—An unsatisfactory condition of affairs in relation to the Corporation gas undertaking was reported at a meeting of the Loughborough Town Council, on Monday last week. The Mayor (who is Chairman of the Committee) stated that the gross profit for the half year had been only £250, compared with £2960—a decrease of 91 p.ct. This sum was insufficient to meet the charges for interest and sinking fund, with the result that the balance brought forward from the previous half year of £1788 had been wiped out, leaving a deficiency of £899. Every item of expenditure showed an increase—coal by £3000, wages by over £1000, and repairs and painting by £1406. He desired to warn the public as to the present serious position of the coal stocks, there being only a fortnight's supply in hand. Unless they could procure more coal, they would be compelled to ration the supply of gas, a step which had been so far avoided; the only alteration which had been made being in reducing the pressure at night.

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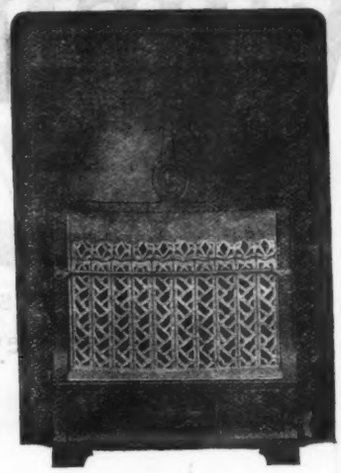
Silent Burners



Most sizes and patterns can be delivered immediately from stock.

"STEAMLESS" RADIATORS Several sizes and patterns of Davis "Steamless" Radiators are also available for immediate delivery.

Address your Enquiry—

The Davis Gas Stove Co., Ltd.,

SALES DEPARTMENT: **60, OXFORD STREET, LONDON, W.1.**

No. 590. STELLA GAS FIRE.
Supplied in various finishes, and can easily be adapted to existing fireplaces.

The clamant call for economy finds an echo in the increased demand for Gas Fires—particularly the Carron patent Stella.
Its simple regulation, low gas consumption, minimum of maintenance, high radiating efficiency and *absolute* silence are a few of the features upon which the reputation and popularity of this Fire have been built.

¶ *For further features of these modern Gas Heaters, write for a copy of the Company's No. 6 A Gas Fire Booklet, just issued.*

CARRON COMPANY Works: CARRON, STIRLINGSHIRE

Branch Works: Phœnix Foundry, Sheffield.

Showrooms: LONDON—15, Upper Thames Street, E.C.4; 50, Berners Street, W. LIVERPOOL—Redcross Street. GLASGOW—Buchanan Street. EDINBURGH — George Street. NEWCASTLE-ON-TYNE — Prudhoe Street. BIRMINGHAM—Corporation Street.

WHEN

You are fixing gas fires save time and money by using

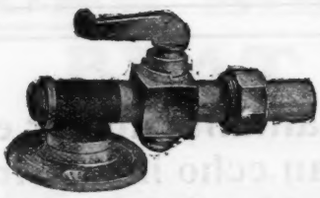
THE "UNEEK"

Two-way Tap.

No Bends Required.

USED AS STRAIGHT-WAY TAP.

Simply alter Position of Screwed Plug.



USED AS ELBOW TAP.

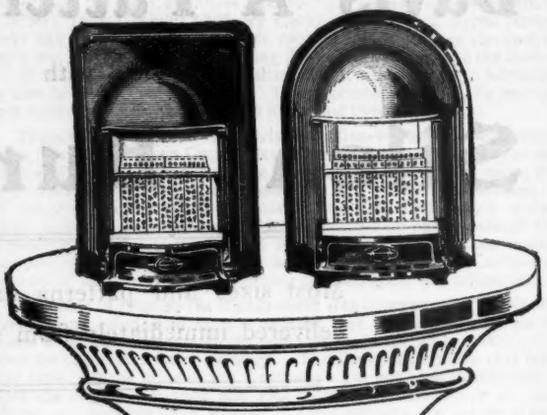
Elbow Stove Tap No. 154.

SAWER & PURVES,

(BRANCH OF METERS LIMITED),

MILES PLATTING, MANCHESTER.

RADFORD ROAD, NOTTINGHAM.



ON THE PEDESTAL OF FAME

"CANNON" FIRES

SECURED FIRST POSITION IN THE OFFICIAL "LANCET TESTS FOR HYGIENIC EFFICIENCY

(See "The LANCET" 4th April 1914.)

Manufacturers—

CANNON IRON FOUNDRIES, LD.

DEEPFIELDS, Nr. Bilston, Staffs.

London Office and Show-Rooms:

57 TO 60, BATH HOUSE, HOLBORN VIADUCT, E.C.

Australasian Agents: MOLDEN & BUDDEN PTY., Ltd.
364a, Little Collins Street, MELBOURNE, Vic., and at SYDNEY, N.S.W.

Reduction in Price at Sandown.—The Sandown Gas Company have decided to reduce the price of gas from 6s. 3d. to 5s. 10d. per 1000 c.ft.. the reduction to take effect from the 1st inst.

Redcar Council to Purchase the Gas Undertaking.—The Redcar Urban District Council last Thursday confirmed, with only one dissentient, the decision to acquire the local gas undertaking.

Midhurst Gas Supply Fails.—Some ten or twelve days ago, there was a failure of the Midhurst gas supply. Matters have since improved; but the private supply of gas is still poor, while there is no public lighting. The Company's official explanation is that heavy rain almost flooded the fires; and that work of renewal, for which they have the material, cannot be carried out because labour is still unobtainable.

Banff Gas-Works Purchase Proposal.—At a meeting of the Banff Town Council in connection with the question of acquiring the Gas Company's undertaking, it was stated that the Clerk had been instructed to get a report from the Engineer as to the condition of the plant. The Convener stated that the report had been received; and it was agreed to remit it to the Lighting and the Finance Committees for consderation.

Gas Price Proposal at Bangor (co. Down).—It was agreed at a meeting of the Bangor (co. Down) Urban Council, that, subject to the reduction of 10s. per ton in the price of coal being confirmed by Parliament and brought into force, the price of gas, as from Jan. 1, other than to those who had received a supply at a reduced rate in special circumstances, be 5s. per 1000 c.ft., instead of 5s. 6d., and that the existing scale of discounts remain in force.

A Warning at Nottingham.—Warning was issued from the Nottingham Gas Department on Friday evening that, if no heed is paid to appeals for the greatest possible economy in the use of gas between 6 a.m. and 8 p.m., it may be necessary to enforce a scheme for the drastic curtailment of supplies between certain hours. Thus Nottingham may be soon placed in a similar position to Leicester, where restrictions have been for some time in force.

Lurgan Gas-Works Inquiry.—Mr. J. F. M'Cabe, Inspector under the Local Government Board for Ireland, held an inquiry last week in Lurgan regarding the Urban Council's application for a Provisional Order to enable them to raise the price of gas in the town from 5s. 6d. to 7s. 6d. per 1000 c.ft., if necessary, and to borrow any sum or sums not exceeding on the whole £5000 for working capital in respect of the gas undertaking. There was no opposition to the application. The facts in relation to it were briefly stated by Mr. C. Johnston, after which Mr. F. W. Pollock (the Town Clerk) gave evidence as to the finances of the town, and the indebtedness of the Council in respect of the gas-works purchase. He contrasted the high prices of gas prevailing in neighbouring towns with the charge in Lurgan. Mr. W. Tallentire (the Gas Manager) having testified to the output of gas and the cost of manufacture compared with previous years, the Inspector intimated that he would report favourably on the application.

New Joint-Stock Companies.—Among the latest new companies are: The Ardee Gas Company has been registered with a nominal capital of £3000, divided into 3000 shares of £1 each. Maclaurin Carbonization, with a capital of £40,000 (20,000 preference, 10,000 "A" ordinary, and 10,000 "B" ordinary shares, of £1 each), to acquire from R. Maclaurin or others any patents or inventions. The Ossett Carbonizing Company, with a capital of £10,000 in £1 shares. Scottish Bye-Products, with a capital of £16,000 (10,000 preference and 6000 ordinary shares of £1 each), to acquire from Maclaurin Carbonization, Ltd., or other persons any patents or inventions.

Charge of Stealing Gas.—At the Dronfield Police Court, Reuben Dearden, an engineer, was charged with unlawfully laying, or causing to be laid, a pipe to connect with a pipe belonging to the Dronfield Gas Company, without their consent, and also with stealing the gas. Mr. W. Orme (Gas Manager) and a fitter stated that on Dec. 22 they found a gas-ring burning in the defendant's house which was supplied with gas passing through a pipe connected by the defendant without the Company's consent. The gas consumed was not passing through the meter. A bunsen burner and another burner had been connected with the pipe in the cellar, which was used as a workshop. Defendant pleaded guilty to connecting the pipe, but urged that in doing so he had no felonious intent. The Bench fined him £4 for the connection, and £1 on the charge of stealing gas.

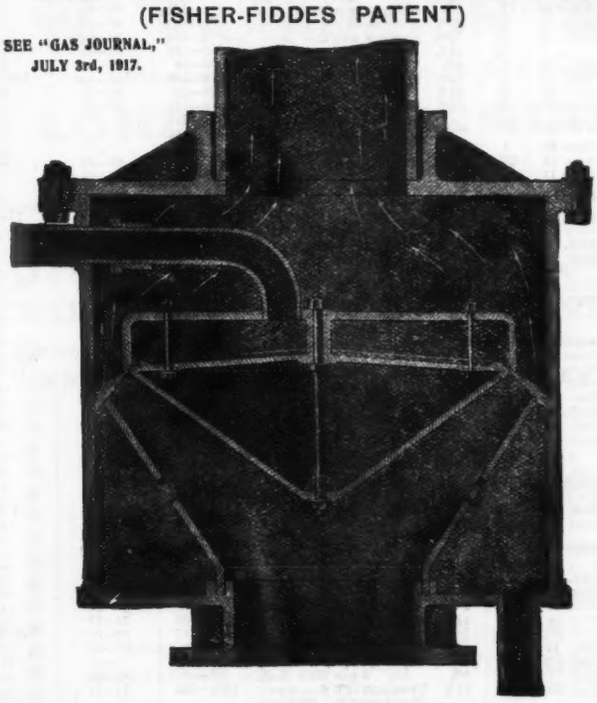
The Todmorden financial statement for the past year, which has just been issued, shows that the gas undertaking made a profit of £707. The most costly department was that of electricity, which resulted in a loss of £3281.

Barnard Castle and Bishop Auckland, both near to the Durham coalfields, were deprived of gas last week, consequent upon the coal shortage. Tuam (co. Galway) was last week also without a gas supply, owing to coal scarcity.

The Leek Urban District Council have decided to accept the tender of Messrs. R. & J. Dempster, of Manchester, for a new gasholder, tank, valves, trunk mains, and iron and steel work in the valve-house, for the sum of £32,250, and the tender of a local firm for excavation and other work.

A very pleasant evening was spent on Monday of last week by the staffs of the Engineer and the Secretary of the Bath Gas Company, who were entertained at dinner by their Chiefs—Mr. J. Wesley Whimster and Mr. W. Blundell. Mrs. Whimster and Mrs. Blundell were also present; and supporting the hosts and hostesses were Mr. C. E. Merchant (Assistant Secretary) and Mr. K. Gandon (Assistant Engineer). There was a short toast list, and an excellent musical programme; and during the evening a handsome tantalus and a case of briars were presented to Mr. G. E. de la Perrelle, who is leaving to take up an appointment in Bristol. Mr. Whimster expressed the good wishes of the staff, which the recipient feelingly acknowledged.

"TAR FOG" & TAR EXTRACTOR
(FISHER-FIDDES PATENT)
SEE "GAS JOURNAL," JULY 3rd, 1917.



FOR THE
ELIMINATION OF
TAR & TAR FOG
FROM COAL GAS AND
OIL VAPOURS
FROM C.W. GAS
WHY NOT TRY THE
NEW METHOD
AUTOMATIC
EFFECTIVE &
INEXPENSIVE
PARTICULARS AND PRICES FROM
R. & J. DEMPSTER, LTD., MANCHESTER.
London Office: CONNAUGHT MANSIONS, 34, VICTORIA STREET, S.W. 1.
London Office Telephone No. Vic. 7426.

As a result of the shortage of coal in France, both Lille and Roubaix were last week reported to be without gas.

The Halifax Gas Committee have qualified for the King's Seal, by the fact of having employed a large proportion of demobilized, discharged, and disabled soldiers at their works.

The total membership of the Federation of British Industries has now reached 1152. The Federation is looking forward to big things occupying its attention during the present year.

The Huddersfield Corporation Gas Committee have placed a contract with Messrs. Drakes, Ltd., of Halifax, for nine beds of through horizontal retorts, with coal and coke handling plant complete.

A statement having been made in the local Press that serious damage had been caused in the Queensbury district by explosions of household gas-meters, owing to an increase of pressure from the gas-works, which are run by Messrs. Foster's, of Black Dyke Mills, the firm have issued a disclaimer, stating that the damage caused had been greatly exaggerated, and was not in consequence of unduly high pressure, but was rather due to the meters being of an obsolete pattern.

Trade is good in the gas-meter and appliances department of Messrs. J. Milne & Son, Ltd., of Edinburgh, who also specialize in paper-making machinery. The Company have paid a dividend of 10 p.ct., and placed £10,000 to the reserve fund.

Eliza Shaw, of Belfast, was discovered dead in the kitchen of her house with the end of a gas-tube in her mouth; the tap feeding the tube being turned full on. Her husband had been out of employment, and this would seem to have preyed on her mind.

The Town Clerk of Burnley has received from the Ministry of Health sanction for the borrowing of £9200 for the purchase of land at Old Hall; and the Gas Engineer (Mr. J. P. Leather) has been instructed to obtain estimates for the erection of a new holder as early as possible.

The Halifax Corporation Gas Committee have authorized the Gas Engineer (Mr. W. B. M'Lusky) to appoint six female inspectors, at a remuneration of £2 each per week, to visit the various houses in the district with a view to obtaining the best results from the consumers' gas-fittings.

STOCK MARKET REPORT.

THE Stock Exchange last week did not succeed in fully maintaining the strength it evinced at the opening of the new year; and a spirit of cautiousness and avoidance of bold commitments was abroad. However, there was not much harm done by this; and the final prices were not the worst of the week.

The gilt-edged market, though it was the scene of some amount of fluctuation, did fairly well on the whole. Home Government issues varied from time to time; but the leaders wound-up fractionally better—viz., Consols 51½-52, War Loan 91⅞-92½, Funding 75⅝-76⅜, Victory 81¼-82. Bonds were firm, and Colonials were in good demand.

Home Rails were damped by the labour outlook, and a good bit of profit-snatching sent prices downward. Canadians were rather better; but Argentines were out of favour.

The Foreign Market was not very strong. French Loans were still further depressed by the exchange; but Mexican, Brazilian, and Chinese were firm.

In the Miscellaneous Market, a feature was the appearance of the Banks' accounts; and some perhaps will frown upon such huge profits. Rubber was dull; but Oil did well. Textiles were sold to secure profits.

Business in the Gas Market was more active, and the general tendency was firm. In the London Companies, prices were about the same as in the week before. Suburban and Provincial were quiet. Newcastle quotation was 3 lower; but South Shields rose 1. Dealings in Derby stock at 80-85 and in ditto debenture at 70-75 are reported locally. Imperial Continental was active and strong; the stock advancing 5, and the debenture 4. A feature was the large number of dealings in the lesser known undertakings classed as "supplementary."

Bargains done for cash during the week were as follows: On Monday, Bombay 5, British 25½, 26, 26½, Commercial 4 p.ct. 56, ditto 3½ p.ct. 51½, European 10½, Imperial Continental 138, 138½, 139, Primitiva 40s., 41s. 3d., 43s. 9d., ditto preference 73s. 9d., 75s., 76s. 3d., 77s. 6d., ditto debenture 71, 71½, South Metropolitan 56½, 57, 57⅜, 57½, 57⅝, Preston 10 p.ct. "A" 120½, Kingston-on-Thames 59. On Tuesday, Bombay 5, Cape Town 6½, Commercial 3½ p.ct. 51½, Continental Union 29½, Gas Light ordinary 57½, 57⅝, ditto maximum 44½, Imperial Continental 138½, 139, Oriental 103, 103½, 104, Primitiva 42s. 6d., 43s. 6d., San Paulo debenture 41, South Metropolitan 56½, 57, Gravesend and Milton 24⅝. On Wednesday, European 10⅜, Gas Light ordinary 57⅜, 57½, ditto debenture 50½, 50⅝, Imperial Continental 138, 138¼, 138½, 139, 139½, Maidstone 55¾, Monte Video 77⅛, Primitiva 41s. 3d., 42s. 6d., 43s. 6d., ditto preference 73s. 9d., 75s., South Metropolitan 56½, 57½, 58, Tottenham "B" 52½, 52¾, 53. On Thursday, Bombay 5½, Gas Light ordinary 58, Imperial Continental 137, 137⅜, 138, 139½, 140, Primitiva 40s., ditto preference 72s. 6d., 73s. 9d., 76s. 3d., South Metropolitan 58, Rochester, Chatham, and Gillingham 51½, Sheppey 31½. On Friday, Gas Light ordinary 56⅞, 57¼, 57½, 58, ditto debenture 50¼, 50⅝, 51, Ilford debenture 61, Imperial Continental 140, 140½, 140⅝, 141, 141½, 142, 143, 144, ditto debenture 90, Monte Video 73, Primitiva 41s. 3d., ditto preference 71s. 3d., Croydon "C" 99.

In the Money Market, there was an abundant supply, and marked ease ruled rates throughout the week, but discount terms stiffened somewhat. Silver rose to 79½d. The Bank rate is 6 p.ct., as fixed on Nov. 6, 1919.

ANTE-WAR PRICES AND DIVIDENDS, LATEST DIVIDENDS, AND LAST WEEK'S BARGAINS.

Issue. £	Shares.	When ex-Dividend.	Ante-War Dividend & Bonus. p.c.	Last Dividend.	NAME.	Closing Prices, July 30, 1914.	Present Prices.	Lowest and Highest Prices of Bargains.
122,049	Stk.	July 31	4	4%	Aldershot 4 p.c. Pref.	..	60—65	..
1,551,868	"	Sept. 26	2½	2⅞%	Alliance & Dublin Ord.	53—54	45—50	..
874,000	"	July 11	4	4%	Do. 4 p.c. Deb.	76—79	62—64	..
330,000	5	Oct. 30	7½	8%	Bombay, Ltd.	5⅜—5⅝	5—5⅛	5—5⅛
60,000	10	Aug. 28	16	12%	Bourne- { 10 p.c.	20—30	19—30	..
883,110	10	..	7	7%	mouth Gas { B 7 p.c.	15—15½	10—11	..
115,000	10	..	6	6/-	and Water { Pref. 6 p.c.	13½—14	9½—93	..
159,745	—	Dec. 30	—	4%	{ 4 p.c. Deb.	..	84—86*	..
992,046	Stk.	July 11	14	37/-	Brentford A Consolid.	231—236	56—61	..
734,930	"	..	11	31/3	Do. B New	204—209	52—57	..
65,000	"	..	5	8%	Do. 5 p.c. Pref.	109—111	72—78	..
221,400	"	Dec. 11	4	4%	Do. 4 p.c. Deb.	91—93	64—66	..
214,775	"	Sept. 11	11	7½%	Brighton & Hove Orig.	206—213	123—128	..
344,230	"	..	8	5⅓%	Do. A Ord. Stk.	154—159	84—87	..
933,500	Stk.	—	5	5%	Bristol 5 p.c. max.	..	..	..
530,000	10	Sept. 26	12½	10%	British	44—45	25—27	25½—26½
120,000	Stk.	Dec. 30	4	4%	Do. 4 p.c. Deb. Stk.	85—90	51—56*	..
945,771	"	..	4	4%	Buenos Aires 4 p.c. Deb.	85—87	47—50*	..
100,000	10	—	—	—	CapeTown & Dis. Ltd.	1½—2½	6½—7½	6½
130,000	10	Oct. 30	—	4½%	Do. 4½ p.c. Pref.	4—6	6½—7	..
150,000	Stk.	Dec. 30	4½	4½%	Do. 4½ p.c. Deb. Stk.	70—75	58—63*	..
157,150	"	Dec. 26	5	5%	Chester 5 p.c. Ord.	108—110	..	..
1,518,980	"	Aug. 14	5/9/4	33 4	Commercial 4 p.c. Stk.	106—108	56—61	56
830,000	"	..	5½	26/8	Do. 3½ p.c. do.	103—105	51—56	51½
475,000	"	Dec. 11	3	3%	Do. 3 p.c. Deb. Stk.	69½—71½	49—51	..
300,000	"	..	4	—	Continental Union Ltd.	76—79	30—35	29½
200,000	"	..	7	—	Do. 7 p.c. Pref.	115—118	40—60	..
61,600	Stk.	Aug. 28	14½	12%	Croydon A 10 p.c.	..	135—145	..
278,430	—	..	11½	9%	Croydon B and C 7 p.c.	..	95—105	..
499,270	Stk.	—	6	5⅓%	Derby Con. Stk.	138—145	..	..
55,000	"	—	4	4%	Do. Deb. Stk.	102—104	..	..
1,003,180	19	July 30	13	5/0	European, Ltd.	17½—18	10—11	10⅜
16,298,975	Stk.	..	4/17/4	80/-	Gas { 4 p.c. Ord.	93—102	56—59	56⅜—58
3,600,000	"	..	3¼	26/8	Light { 3½ p.c. max.	73—79	44—46	44½
4,062,235	"	..	4	4%	and { 4 p.c. Con. Pref.	96—99	64—67	..
4,674,350	"	Dec. 11	8	8%	Coke { 3 p.c. Con. Deb.	73½—74½	50—53	50½—51
130,000	"	..	10	10%	{ 10 p.c. Bonds	..	..	..
82,500	"	Sept. 11	5	4⅓%	Hastings & St. L. 5 p.c.	..	57—62	..
258,740	"	..	3½	2⅞%	Do. 3½ p.c	37—39	40—45	..
70,000	10	April 29	11	7%	Hongkong & China, Ltd.	16½—18½	8½—9½	..
66,600	Stk.	Aug. 28	9	8⅓%	Hornsey 7 p.c.	..	90—95	..
151,000	"	Sept. 11	7½	5⅔%	Ilford A and C.	151—154	88—93	..
65,730	"	..	6⅔	4⅔%	Do. B	115—118	67—72	..
66,500	"	Dec. 30	4	4%	Do. 4 p.c. Deb.	92—94	59—63*	61
4,940,000	"	May 14	9	4½%	Imperial Continental	156—160	140—145	137—144
1,325,000	"	Aug. 14	3½	3⅓%	Do. 3½ p.c. Deb. Red.	84—86	85—90	90
335,142	"	Sept. 11	6¼	5⅓%	Dee Bridge Ord. 5 p.c.	119—121	86—91	..
2,493,935	"	Feb. 26	10	42/6	Liverpool 5 p.c. Ord. { A / B	211—213 / 145—149	..	.. / ..
806,084	"	June 26	4	4%	Do. 4 p.c. Pr. Deb. Stk.	..	..	..
165,738	"	Aug. 14	7/5/5	33⅓%	Maidstone 5 p.c.	..	56—61	56½
75,000	5	June 11	3	3%	Malta & Mediterranean	4½—4¾	1½—2½	..
250,000	100	Oct. 1	4½	4½%	Met. of { 4½ p.c. Deb.	98—101	90—97	..
541,910	Stk.	Nov. 27	4	5%	Melbourne {			
1,875,822	"	July 30	4½	3⅓%	Monte Video, Ltd.	11½—12	72—77	73—77½
529,705	"	Dec. 30	5½	5⅓%	Newcastle&Gateh'd Con.	98½—99½	66—67	..
15,000	10	Sept. 11	—	11⅓%	Do. 8½ p.c. Deb.	83—88	55½—56½*	..
55,940	10	..	7/14/0	7½%	North Middlesex 10 p.c.	..	13½—13⅔	..
600,000	Stk.	Nov. 27	8	8%	,, ,, 7 p.c.	14—15	9—9½	..
60,000	5	Mar. 26	10	1/-	Oriental, Ltd.	117—120	102—105	103—104
60,000	50	Aug. 28	12	7⅓%	Ottoman, Ltd.	7½—7¾	4⅜—5½	..
120,000	50	..	12	6½%	Portsea, Island B	128—131	60—65	..
349,980	5	April 29	3	—	Do. C	115—121	54—57	..
499,960	5	June 26	5	—	Primitiva Ord.	55—8	1⅜—2½	40/—43/9
521,600	100	Dec. 1	4	4%	Do. 5 p.c. Pref.	4⅜—5	3½—4	71/8—77/6
600,000	Stk.	July 30	4	4%	Do. 4 p.c. Deb.	91—93	70—72	71—71½
846,198	"	Dec. 30	4	4%	Do. ,, ,, 1911	..	49—52	..
150,000	10	Sept. 26	8	6/-	River Plate 4 p.c. Deb.	85—87	47—50*	..
125,000	50	Dec. 30	5	5%	San Paulo { 5 p.c. Pref.	104—11	7½—8	..
135,000	Stk.	Aug. 28	10	8%	{ 5 p.c. Deb.	41—42	39—41*	41
209,984	"	..	10	8%	Sheffield A	223—224	75—80	..
223,500	"	..	10	4⅓%	Do. B	223—224	75—80	..
133,201	Stk.	Sept. 12	4	4%	Do. C	220—221	75—80	..
90,000	10	Oct. 15	9	10%	Shrewsbury 5 p.c.	..	..	..
6,669,895	Stk.	Aug. 14	5/4/9	30/-	South African	10½—11½	12—13	..
250,000	"	July 11	—	6%	South Met. 4 p.c. Ord.	11⅞—113	56—62	56½—58
1,895,445	"	..	8	8%	Do. Pref.	..	94—96	..
234,230	"	Aug. 14	8½	6%	Do. 3 p.c. Deb.	72½—74½	51—54	..
952,795	"	..	8	8⅓%	South Shields Con. Stk.	107—109	105—107	..
187,568	Stk.	Dec. 30	5	5%	S'th Suburb'n Ord. 5 p.c.	114—116	68—73	..
647,740	"	Nov. 18	7½	8⅓%	Do. 5 p.c. Deb. Stk.	116—118	78—83*	..
131,375	"	Dec. 30	4	4%	Southampton Ord.	99—102	61—63	..
190,000	"	Aug. 14	4	4⅓%	Do. 4 p.c. Deb. Stk.	..	61—68*	..
782,275	"	..	6	8%	Tottenham { A 5 p.c.	135—138	70—75	..
131,355	"	Dec. 11	4	4%	{ B 3½ p.c.	115—117	50—55	52½—53
182,380	10	Dec. 30	5	—	District { 4 p.c. Deb.	87—89	63—65	..
149,900	10	July 1	5	5%	Tynemouth 5 p.c. max.	5—8	1—2	..
235,476	Stk.	Sept. 26	5	3⅓%	Do. 5 p.c. Deb. Red.	93—95	45—50	..
					Wandsworth, Wimbledon, and Epsom—	108½—109	74—76	..
30,000	"	Aug. 28	8⅝	55/-	Wandsworth A 5 p.c.	151—155	85—90	..
255,886	"	..	6¾	40/-	Do. B 3½ p.c.	129—134	63—68	..
108,075	"	..	—	38/6	Do. C	..	63—68	..
143,385	"	..	—	38/6	New Ordinary	..	63—68	..
352,000	"	..	6⅓	33/9	Wimbledon 5 p.c.	117—123	65—70	..
96,000	"	..	6¾	40/-	Epsom 5 p.c.	131—136	65—70	..
88,416	"	Dec. 30	8	8%	3 p.c. Deb. Stk.	68—89	48—50*	..

* Ex Div.